Supplemental Remedial Design Investigation Report
Mercury Refining Superfund Site
Colonie, New York

Prepared for

Mercury Refining Site Remedial Action Group

February 2013

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Project Number: 142324.300.500

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AAMP	Ambient Air Monitoring Plan
BC	Brown and Caldwell Associates
BGS	Below ground surface
CSB	Container Storage Building
DO	Dissolved Oxygen
DUSR	Data Usability Summary Report
HSA	Health and Safety Audit
HSCP	Health and Safety Contingency Plan
IDW	Investigation Derived Waste
ISS	In Situ Solidification/Stabilization
MVA	Mercury Vapor Analyzer
NAD	North American Datum
NGVD	National Geodetic Vertical Datum
NYSDEC	New York State Department of Environmental Conservation
NYSDOL	New York State Department of Labor
ORP	Oxidation-Reduction Potential
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
PDS	Pre-Demolition Survey
PM	Project Manager
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
PACM	Potentially Asbestos Containing Material
PARCC	Precision Accuracy Representativeness Completeness Comparability
PLM	Polarized Light Microscopy
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RD AOC	Remedial Design Administrative Order on Consent
RDWP	Remedial Design Work Plan
RDWPA	Remedial Design Work Plan Addendum
ROD	Record of Decision
SF	Square Foot
SRDI	Supplemental Remedial Design Investigation

SSO	Site Safety Officer
STP	Standard Penetration Test
TCLP	Toxicity Characteristic Leaching Protocol
TEM	Transmission Electron Microscopy
TS	Treatability Study
TWA	Time Weighted Average
UFPO	United Facilities Protective Organization
UFPQS	Uniform Federal Policy for Implementing Quality Systems
USCS	Unified Soil Classification System
USEPA	United States Environmental Protection Agency
XRF	X-Ray Fluorescence

Section 1

Introduction

This report presents the results of supplemental Remedial Design Investigation (SRDI) activities conducted at the Mercury Refining Superfund Site, located at 26 Railroad Avenue in the Towns of Colonie and Guilderland, Albany County, New York (the Site, see Figures 1-1 and 1-2). One of the objectives of the initial Remedial Design Investigation, conducted in 2010-2011, was to delineate the extent of dissolved mercury in groundwater above the action level specified in the ROD (0.7 ug/L) for implementation of in-situ solidification/stabilization (ISS). The initial RDI results indicated that dissolved mercury concentrations were above the action level in a limited area immediately surrounding the former retort pad (Brown and Caldwell Associates. December 2011). Although no actual sampling was conducted beneath the then-occupied adjacent Container Storage Building (CSB), the initial RDI results suggested the potential for concentrations above the action level to exist under the northeast portion of the CSB. As described in this report, understanding this potential was a primary focus of the SRDI.

An addendum to the Remedial Design Investigation Work Plan (the RDWPA) was prepared to address the scope of the SRDI and provide QA/QC specifications for work not contemplated by the original RDWP or QAPP. The draft RDWPA and revised QAPP were submitted to EPA on March 20, 2012. EPA provided comments on the draft documents on April 4, 2012. As detailed herein, it was necessary to demolish the CSB to implement the RDWPA and accordingly, EPA approved those portions of the RDWPA pertaining to the pre-demolition survey of the CSB. EPA provided supplemental comments on the revised QAPP on April 10, 2012. Responses to both the original and supplemental comments were provided to EPA by letter dated April 28, 2012. On May 8, 2012 EPA provided additional comments on six of the April 28 responses. The proposed revisions of the RDWPA were approved by EPA on May 29, 2012 and the final RDWPA was prepared (Brown and Caldwell Associates, June 2012).

In April 2012, a pre-demolition survey of the CSB was conducted to identify potentially regulated materials. A Pre-Demolition Survey Report was submitted to the EPA on May 23, 2012 (Brown and Caldwell Associates, May 2012). Demolition plans and specifications were prepared and submitted to the EPA on May 30, 2012. The plans and specifications were revised to address EPA comments received on June 6, 2012. To address community air monitoring requirements during CSB demolition, the Ambient Air Monitoring Plan included in the 50% Remedial Design submittal was finalized in accordance with the EPA's comments on the design submittal.

Section 2.0 describes the rationale, planning and implementation of the CSB demolition. Section 2.0 also describes the methods and materials utilized in conducting the SRDI. Section 3.0 presents the findings of the SRDI, and Section 4 presents the revised extent of ISS based on the SRDI findings.

Section 2
SRDI Activities

This section of the report describes the field activities conducted as part of the SRDI, including planning for and implementing the demolition of the CSB, pre-screening of soil and groundwater under the CSB, and installation and sampling of groundwater monitoring wells.

2.1 Health and Safety

Health and Safety monitoring on the Site was conducted in accordance with the revised Health and Safety Contingency Plan (HSCP), submitted as an attachment to the EPA- approved RDWPA. The HSCP complied with the standards of the Occupational Safety and Health Administration (OSHA) as stated in 29 CFR. A Site Safety Officer (SSO) was designated on a daily basis depending on planned on-Site activities and the personnel performing the activities. The SSO made daily visual inspections for compliance with the HSCP and noted any deficiencies for immediate correction. Additionally, Health and Safety Audits (HSA) were completed by the Project Coordinator and task-specific Site personnel for each field investigation activity; no deficiencies were noted by the SSO, Project Coordinator or other personnel. Results of the HSA are provided on HSA Checklists included as Appendix A to this report.

2.1.1 Community Air Monitoring During Building Demolition

During CSB demolition activities, air monitoring was conducted in accordance with the EPA-approved Ambient Air Monitoring Plan (AAMP) originally contained in Appendix F of the Preliminary Remedial Design Report (Brown and Caldwell Associates, March 2012) and revised June 2012.Continuous air monitoring for particulates was conducted at four air monitoring stations surrounding the work zone with two upwind locations (Stations 1 and 2) and two downwind locations (Stations 3 and 4)designated on the basis of wind directions and the locations of potential off-site receptors. The prevailing wind direction during the demolition was northwest. Air monitoring stations were positioned south of the work zone as well as along the fence line east of the work zone. These stations were positioned to ensure particulates did not travel off-site to the neighboring business to the east of the Site or towards the railroad tracks to the south. The locations of the air monitoring stations are noted on the figure Air Monitoring Station Locations contained in Appendix B. Technical difficulties encountered with the air monitoring equipment prior to the start of demolition activities did not allow for collection of pre-demolition ambient baseline data. Air data collected during the demolition activities is provided in Appendix B-1, including, for each of the two days of activity, a summary table of excursions beyond action levels, causes and response actions.

On day one of the demolition activities, Station 1 recorded instantaneous readings every second rather than 15 minute time-weighted averages, and Station 2 did not function. On day two, Station 1 did not function. Readings above 150 µg/m^3 TM-10 (particulate matter less than 10 micrometers in size) were periodically noted in Station 1 (upgradient of the work zone) on the first day of demolition. These elevated readings were caused by vehicle traffic over gravel near the site entrance. Brief periods of elevated particulate levels occurred occasionally during demolition and waste loading activities. Work was interrupted and the ground surface and demolition debris were wetted with potable water to return conditions below the action levels. No readings above the 15 minute TWA action level for particulates

were noted at the downwind stations. Periodic monitoring (instantaneous readings every 15 minutes) of mercury vapor was conducted upwind and downwind of the active demolition zone using a Jerome431-X Mercury Vapor Analyzer (MVA). No vapor concentrations were detected in excess of the action level[1] of 0.0025 mg/m^3.

2.1.2 Air Monitoring During Soil and Groundwater Investigation

During any intrusive SRDI activity, continuous air monitoring was conducted with the MVA to measure airborne mercury vapor levels. Background MVA readings were obtained daily from an area removed from and upwind of the established exclusion zone. To confirm that the proper level of personnel protection was utilized by on-Site personnel, continuous air monitoring during field investigations was conducted in the breathing zone. Periodic monitoring was also conducted at the down-wind edge of the established exclusion zone to ensure protection of public health. Air monitoring forms containing the background MVA readings and MVA readings from within the exclusion zones during the field investigation activities are provided in Appendix B-2. MVA readings, both background and from the exclusion zones were consistently non-detect (0.0 mg/m^3) throughout all intrusive activity.

2.2 Quality Assurance

Work implemented at the Site and the type and quality of the data collected as part of the SRDI were in accordance with the revised Quality Assurance Project Plan (QAPP) attached to the RDWPA. The QAPP was prepared in accordance with the Uniform Federal Policy for Implementing Quality Systems (UFP QS) [EPA 505 F 03 001] (IDQTF, 2005a), and the Uniform Federal Policy for Quality Assurance Project Plans (UFP QAPP), [EPA 505 B 04900A through C] (IDQTF, 2005b).

Except where specifically noted in the following subsections of Section 2 of this report, the SRDI was conducted in accordance with the RDWPA and revised QAPP. Modifications made to investigation scope and/or methodologies were approved prior to implementation in discussions with the USEPA Remedial Project Manager and/or documented in the monthly progress reports provided to the USEPA.

A comprehensive, qualitative data review was performed for each laboratory result to verify that the information generated for the sample is complete and accurate. Data Usability Summary Reports (DUSRs) were prepared for each sample matrix data package (Appendix C).

2.3 Property Access

Activities conducted as part of the SRDI were entirely within the MERECO property boundaries and approvals from the adjacent property owners were not required.

2.4 Utility Markouts

Prior to the subsurface activities, the drilling subcontractor (Parratt-Wolff, Inc. of Scottsville, East Syracuse, NY) contacted United Facilities Protective Organization (UFPO) to obtain clearances and mark outs for buried utilities. Additionally, existing sewer plans and surficial observations of catch basins and manholes were utilized to aid in the location of current and former storm sewer lines.

2.5 Surveying

Surveying services were completed by MJ Engineering and Land Surveying, P.C., a New York State licensed surveyor. Coordinates were referenced to the State Plane coordinate system for New York

[1] Per the AAMP, the action level for mercury vapor is a sustained reading of >3 µg/m^3 (0.0025 mg/m^3). A sustained reading is defined in the AAMP as the average airborne concentration maintained for a period of one (1) minute above background levels.

using the North American Datum of 1983 (NAD 1983) in units of feet. Elevations were referenced to the National Geodetic Vertical Datum (NGVD) of 1929 in units of feet. The survey also included the following updates to existing survey information:

- Alignment of recently installed chain link fence; and
- Updated topographic elevations on the portion of the Allied Property that abuts the MERECO property where recent paving had occurred.

The updated topography and fence alignment will be incorporated in the remedial design drawings. Surveyed locations of all sampling points and monitoring wells are shown on Figure 1-2 (Site Plan). Elevations and location coordinates are provided in Table 2-1.

2.6 Investigation Derived Waste

Investigation-derived waste (IDW) was handled in accordance with the RDWPA. Wastes derived from the demolition of the CSB are described in Section 2.7.2.

Aqueous IDW generated from SRDI activities as well as accumulated waste water from the secondary containment system of the former CSB was stored on site in a 1,500 gallon poly tank and in a 10,000 gallon fractionation (frac) tank. Based on analytical data, the waste water was classified as non-hazardous. Solid and semi-solid IDW generated from the SRDI activities was placed in 55 gallon DOT approved steel drums, labeled appropriately (e.g., drum contents, date, sample locations), and staged securely within the fenced portion of the MERECO property for characterization and disposal. Wastes were segregated and stored in a total of 56 drums based on waste type (soil, water, PPE, etc.). Available analytical data from environmental media were correlated with the particular contents of each IDW drum. Based on these data, the contents of the drums were classified into two categories: 1) non-hazardous (concentrations of TCLP mercury < 0.2 mg/L), and 2) hazardous (concentrations of TCLP mercury >0.2 mg/L). An inventory of the drum and tank contents, relevant analytical data, and waste classification (hazardous or non-hazardous) is provided in Appendix D-1.

Waste profiles previously created for disposal of IDW from the 2010-2011 RDI activities were re-certified and submitted to the Environmental Quality Company (EQ) of Detroit, Michigan for eventual treatment and/or landfill disposal. The recertified waste profiles included the following: non-hazardous soil, non-hazardous water, hazardous (D009) soil, hazardous (D009) water, hazardous (D009) mud and water, hazardous (D009) debris, soil in excess of LDR limits, free mercury contaminated soil, and free mercury contaminated mud/water. A new profile was provided for non-hazardous mud and water. Copies of all waste profiles (recertified and new) are provided in Appendix D-1. IDW has been manifested under the USEPA Generator ID No. formerly assigned to Mercury Refining Company (NYD048148175)[2] with the Mercury Refining Site Remedial Action Group identified on the waste manifests as the Generator. Final manifests and bills of lading will be provided to the EPA under separate cover when available.

2.7 Container Storage Building

Removal of the CSB superstructure was required to enable delineation of dissolved mercury in groundwater beneath the CSB. As set forth in the RDWPA, the delineation of dissolved mercury required pre-screening of soil and groundwater under the CSB followed by the installation of multiple monitoring wells using the techniques employed during the initial RDI. It was determined to be infeasible to use the necessary drilling equipment inside the CSB. Furthermore, it was anticipated that ISS could potentially

[2] In 2012, the USEPA reassigned the Generator ID Number formerly assigned to Mercury Refining Company to the Mercury Refining Site Remedial Action Group for its use in disposing of wastes generated in the course of investigating and remediating the site. USEPA assigned a new Generator ID Number to the current site owner for use in conjunction with ongoing metals recycling operations.

be implemented under a portion of the CSB, thereby requiring removal of at least some of the CSB floor and foundation.

The CSB was an approximate 3,000 square foot (SF) wood framed, metal clad, one-story building constructed in 1989. The CSB was designed for use as a RCRA hazardous waste storage facility for the storage of wastes generated in association with Mercury Refining's mercury recovery and recycling operations. In 1998, MERECO leased the CSB to Mercury Waste Solutions-New York, Inc. (MWS). MWS surrendered its lease and ceased hazardous waste operations in 2003. The building underwent a RCRA closure in 2003 (MWS of New York, 2003).

Until recently, the building was leased to a landscape contractor and used for storage of landscaping equipment.

2.7.1 Environmental Assessment and Pre-Demolition Survey

In accordance with the RDWPA, BC performed an environmental assessment and pre-demolition survey (collectively, PDS) of the CSB. The purpose of the PDS was to identify environmental concerns that needed to be mitigated prior to demolition, and to identify building materials that might be subject to regulation as hazardous waste or other requirements. The results of the PDS were provided to the EPA in the May 2012 Environmental Assessment and Pre-Demolition Survey Report (Brown and Caldwell Associates, May 2012). The report is provided as Appendix E and is summarized below. The results of the PDS are tabulated in Appendix A of the PDS report, and photographs of each item or area and are presented in Appendix E of the PDS report.

The PDS was conducted on April 11, 2012 by BC and Alpine Environmental Services, Inc. (Alpine). Alpine was subcontracted by BC to take the samples of materials identified as potentially asbestos containing material (PACM) and analyze materials identified as potentially containing lead with a hand-held X-ray florescence (XRF) analyzer. The Alpine inspector was a licensed New York State Department of Labor (NYSDOL) asbestos inspector (certificate number 95-02581) and New York Certified Lead Based Paint Professional (certificate number NY-113-3). An additional sampling event occurred on April 24, 2012 for the purpose of obtaining exterior wipe samples for mercury analysis.

A total of 26 bulk asbestos samples were collected and analyzed using either Transmission Electron Microscopy (TEM) or Polarized Light Microscopy (PLM). A total of 18 lead-based paint sample locations were analyzed by hand-held XRF.

Six locations inside the CSB were selected for co-located aqueous wipes samples for total mercury, hexane wipe samples for PCBs, and bulk samples for total and Toxicity Characteristic Leaching Procedure (TCLP) mercury. The sample locations were between the floor and approximately three (3) feet high in an area designated as the "splash zone", the portion of the walls that could have been impacted if a storage drum tipped and the contents spilled. This zone was generally covered with either oriented strand board (OSB) or sheetrock. Two (2) locations were identified on the exterior north wall of the CSB from which two additional wipe samples for total mercury were obtained. These locations were identified as having been potentially impacted by airborne mercury from the retort apparatus formerly located in the adjacent Phase 1 Building.

The number of samples collected varied from the scope specified in the RDWPA as follows:

- 26 bulk asbestos (four additional samples collected);
- 1 interior aqueous wipe sample (BC-CSB-PDS-041112-052) for analysis of total mercury (it was not possible to access the steel panel behind the OSB); and
- 2 additional aqueous wipe samples for analysis of total mercury were collected from the exterior of the building.

The number of wipe samples collected for PCB analysis and the number of bulk samples for total mercury analysis did not vary from the RDWPA.

Since total mercury concentrations in four of the bulk samples were above the threshold of 4 mg/kg (indicating a potential to produce leachate concentrations greater than the TCLP limit of 0.2 mg/L), BC returned to the site on May 25, 2012 to collect nine additional samples for analysis of TCLP mercury[3]. The TCLP samples were collected from OSB, sheetrock and wood beams near the previous sample locations. Three samples were collected above the "splash-zone" at approximately 6 to 6.5 feet above the floor. The samples were submitted to TestAmerica Laboratories, Inc., a NYSDOH ELAP certified analytical laboratory, for analysis of TCLP mercury using Method 7470A.

Environmental concerns were categorized as asbestos, lead, PCBs, mercury, oil/grease, or household hazardous chemicals. Results are summarized below.

Asbestos

Materials with greater then one percent (>1%) asbestos are regulated by the EPA and require management as ACM during removal and disposal. The asbestos sampling results indicated that the materials collected and analyzed did not contain asbestos. No asbestos was identified during the PDS.

Lead

The Occupational Safety & Health Administration (OSHA) considers any detectable amount of lead in paint to be hazardous in accordance with 29 CFR 1926.62. The lead-based paint sampling results were negative for all locations sampled. No lead-based paint was identified during the PDS.

Mercury

A total of 7 aqueous wipe samples were collected from non-porous surfaces (5 interior samples and 2 exterior samples).Sampled interior surfaces consisted of steel panels (the sheathing of the building) and steel beams (behind the firewall). Based on the analytical results for the interior wipe samples, mercury was identified as being present on each sampled surface. Based on the analytical results for the exterior wipe samples, no mercury was identified on the exterior of the building.

Total mercury was detected in all six bulk samples at concentrations ranging from 0.84 to 124 mg/kg. None of the nine samples of porous materials subsequently analyzed for TCLP mercury had leachate concentrations above the TCLP limit of 0.2 mg/L. Based on these results, these materials were determined to be acceptable for disposal as non-hazardous construction and demolition debris.

The laboratory reports for the subsequent TCLP analyses are included in Appendix E in addition to the PDS Report.

Polychlorinated Biphenyls (PCBs)

A total of 6 PCB samples were collected by BC. PCBs were not detected in any of the samples. No PCB-containing light ballasts were identified.

Universal Waste

The fluorescent light bulbs in ceiling fixtures, which contain small amounts of mercury, were designated as universal wastes.

[3] Although BC requested TCLP analyses of the bulk samples collected during the initial survey, there was insufficient sample mass remaining after the samples were analyzed for total mercury.

Oils and Greases

One item potentially containing oils and/or greases was identified during the survey. This item consists of a motor located near an opening in the roof which was most likely used for ventilation purposes. No bulk volumes of oils or greases were identified.

Household Wastes

Five items were identified in the survey as household wastes. These items consisted of household chemicals/products (Clorox, Windex, etc.), paint and sealers, and fire extinguishers. The building tenant was vacating the premises at the time of the survey and removed these items prior to the CSB demolition.

Miscellaneous

During the PDS, the tenant (a landscape contractor) was in the process of removing equipment related to the business (lawnmowers, hand-tools, other support materials). These materials were completely removed prior to the CSB demolition.

2.7.2 CSB Demolition& Waste Disposal

The CSB building demolition was conducted on June 21 and 22, 2012 by Land Remediation, Inc. of Averill Park, NY under subcontract to BC. Demolition oversight was conducted by Brown and Caldwell Associates. Additionally, Tom Taccone, the EPA Remedial Project Manager was onsite for a portion of the day on June 21, 2012.A photographic log of the demolition activities is in included in Appendix I. A total of 26.88 tons of non-hazardous construction and demolition debris was disposed of at the Seneca Meadows Landfill in Waterloo, NY under MERECO's USEPA Generator ID No. NYD048148175 with the Mercury Refining Remedial Design Group (Group) identified on the waste manifests as the Generator. Waste manifests and disposal receipts are provided in Appendix D-2.

The following Universal wastes were recycled at eLot Recycling, Inc. in Troy, NY:

- 13 – 6' fluorescent light bulbs,
- four 4' fluorescent light bulbs,
- one halogen bulb, and
- one 2 lb battery.

2.8 Supplemental Delineation of In-Situ Stabilization/Solidification (ISS)

As in the original RDI, the first phase of the ISS delineation consisted of collecting soil and groundwater with direct-push sampling equipment to identify locations and depths with higher total mercury concentrations for further evaluation of dissolved phase mercury. The second phase of the delineation consisted of installing and sampling monitoring wells, using materials and procedures designed to minimize turbidity of groundwater samples and facilitate the measurement of actual dissolved mercury levels.

2.8.1 Pre-Screening Direct-Push Investigation

In accordance with the RDWPA, the direct-push investigation consisted of the installation of soil borings at six locations (ISS-10 through ISS-15) within the former CSB concrete pad. The work was conducted from July 25 through 29, 2012. As-built locations and boring data are provided in Figure 2-1 and Table 2-1. Each boring was installed in the vicinity of the locations proposed in Figure 4-1 of the RDWPA. Drilling services were performed by Parratt-Wolff.

Prior to advancing the direct push borings, the reinforced concrete floor at each location was cored with a "star" bit attached to the direct-push rig. Samples of the concrete fragments were collected from near the surface of the pad from three locations (ISS-11, ISS-13 and ISS-15) and submitted for analyses of total mercury by USEPA Method SW-846 7471 and TCLP Mercury by USEPA Method SW-846 7470A.

The direct-push soil borings were advanced into the top of the Lake Albany Silt and Clay confining layer (total depths ranging from 63 to 72 ft below the CSB pad surface). Borings were advanced with the use of a blind point macro core sampler to exclude non-targeted soils from the barrel. The barrel was advanced the full 4 feet (one push) to each target depth. Each sample was collected with a dedicated, new acetate liner.

Samples from each sampler were screened in the field using a Jerome 431 X mercury vapor analyzer (MVA) and inspected for noticeable signs of contamination such as visible elemental mercury (none were observed in the SRDI borings). Soil samples were visually characterized in the field by an experienced hydrogeologist and logged in accordance with a system after Burmister (1959). In addition, the Burmister classification was converted to the Unified Soil Classification System (USCS) on the final boring logs (provided in Appendix F).

Samples for chemical analysis were immediately transferred from the acetate liners using stainless steel scoops, trowels, or equivalent tools to appropriate laboratory-supplied containers and stored and handled according to procedures specified in the RDWPA. Samples were collected from the six inch interval(s) with the greatest MVA readings or visual evidence of contamination. If no MVA readings were detected or visual evidence of contamination was not observed, sampling was conducted at a rate of at least one sample per ten foot interval that the boring was advanced. Seven to nine soil samples per boring were collected as depicted on Figures 3-1 and 3-2. All samples were transferred to appropriate laboratory-supplied containers and analyzed by Test America of Buffalo, New York for Mercury via USEPA Method SW 846 7471A.Accelerated (24 hour) laboratory turnaround was requested to facilitate the groundwater screening described in the following paragraph. For IDW characterization, seven discrete samples collected for mercury analysis were also analyzed for TCLP Mercury by USEPA Method SW 846 7470A. The samples for TCLP analysis were selected based on field screening results that indicated the potential for elevated mercury concentrations.

After receipt of the unvalidated soil analytical results, a GeoProbe® Groundwater Sampler was utilized to collect groundwater quality samples from discrete intervals within the saturated zone adjacent to each of the six boreholes described above. The groundwater sample intervals were determined based on the depths with elevated mercury levels in soil as well as the capacity of the depth interval to yield sufficient volumes of groundwater for purging/sampling/analysis. Groundwater samples were collected for laboratory analysis at a rate of approximately one sample per ten foot interval within the saturated zone, and ranged from five to six samples per hole, depending on the location (refer to Figures 3-1 and 3-2 for sample intervals).

The groundwater sampler was advanced to selected intervals within the saturated zone, at which time the outer casing of the sampler was pulled back to expose a four-foot screen. Water was allowed to infiltrate the screen for periods of time ranging from 30 to 90 minutes (time varied depending on the groundwater production rates of the various intervals). If the groundwater sampler yielded enough water, a peristaltic pump with dedicated polyethylene tubing was used to collect a sample. In some cases where minimal water had entered the screen, dedicated polyethylene tubing with a stainless-steel check valve attached at the bottom was gradually lowered until it came in contact with the water surface and was then allowed to fill as it slowly sank in a controlled manner. Samples collected thusly were retrieved with a minimal amount of agitation. Due to high turbidity, a filtered and a non-filtered sample were collected from each interval. As was the case during the RDI, due to the silty zone present in the

five foot zone immediately below the water table, BC was unable to collect groundwater samples using the groundwater sampler.

Groundwater samples were transferred into appropriate laboratory supplied containers to be analyzed by TestAmerica of Buffalo, NY for mercury by USEPA Method SW 7470A. Accelerated (24 hour) laboratory turnaround was requested to facilitate consideration of appropriate monitoring well screen depths.

After collection of the groundwater samples, the tubing was removed from the groundwater sampler and properly discarded. The check valve and drilling equipment were decontaminated prior to drilling at each location. If the borehole remained open after retrieval of the groundwater sampler, the borehole was grouted with a tremie pipe. Grout consisted of bentonite slurry to avoid elevated pH conditions associated with cement/bentonite mixtures.

2.8.2 Monitoring Well Installations

Following review of the preliminary soil and groundwater screening data with EPA, four clusters of conventional 2-inch PVC monitoring wells (12 wells total) were installed: MW-ISS-10S/I/D, MW-ISS-11S/I/D, MW-ISS-12S/I/D, and MW-ISS-13S/I/D. The wells were installed from July 27 through August 20, 2012 (see Figure 2-1 for locations).Based on the levels of dissolved phase mercury concentrations identified during the direct-push screening phase, and on subsequent discussions with the EPA, two well clusters (MW-ISS-10 and MW-ISS-11) were installed within the CSB pad in the vicinity of direct-push locations ISS-14 and ISS-15, and two well clusters (MW-ISS-12 and MW-ISS-13)were installed south of the CSB pad within the clay cap to fill potential data gaps in the ISS delineation area. This was a minor departure from the RDWPA since only three well clusters were originally proposed, all located within the former CSB pad. Figure 3-2 shows screen intervals for wells within the CSB pad relative to soil and groundwater screening results. The screen intervals for the wells located south of the CSB pad were installed at elevations comparable to the wells within the ISS pad (Figures 2-2 and 2-3). The screen intervals and well locations were approved via email from the EPA on August 1, 2012.

Soils were logged in the deepest boring of each of the two well clusters located south of the CSB because no direct-push borings had been advanced at these locales. Standard Penetration Tests (SPTs) were performed using a split-barrel (“split spoon”) sampler according to ASTM D1586-08a. Samples were logged as described in Section 2.3.1. The boring at MW-ISS-12D was logged continuously via split spoons prior to installation of the well at this location to provide geologic characteristics and to confirm the depth to the contact with the Lake Albany Clay. At MW-ISS-13D, split spoon sampling was conducted every five feet with continuous sampling conducted below 50 feet bgs to confirm the depth of contact with the Lake Albany Clay. Monitoring well boring logs are included in Appendix F. Drilling services were performed by Parratt-Wolff.

All monitoring wells were installed by drive and wash casing method to minimize the potential for “drag down” of mercury contamination from shallower intervals, and allow for better control over the placement of the sand pack around the well screen, a key element in minimizing the migration of suspended solids into the well. A 5-inch ID steel casing was advanced to isolate the surrounding formation during the boring and well construction process. The casing was advanced in five-foot intervals. After each interval, the soil in the casing was cleaned out with a roller bit and flushed with clean, potable water.

Upon reaching the target depth, a 2-inch diameter PVC pre-packed well screen (0.010 inch slot size) was installed and additional sand pack material was placed in the annulus surrounding the pre-pack screen as the 5-inch casing was withdrawn. The casing was removed slowly as clean washed sand was placed in the annular space between the pre-packed well screen and the casing, from the base of the screen to approximately two feet above the screen. Measurements of material depths were made frequently by sounding the annulus with a weighted tape measure during installation and the volume of materials

needed were calculated and compared to the actual volume used to assure that no voids within the well screen filter pack had occurred. The remainder of the overburden monitoring well construction was completed in accordance with the RDWP as follows:

- A layer of bentonite pellets, at least two inches thick, was placed above the sand pack to form an annular seal.
- Cement/bentonite grout was placed from the top of the bentonite pellet seal to a point approximately two feet below existing ground surface.
- For the wells are located in the CSB pad, an 8-inch diameter heavy duty flush mount traffic-rated well vault box was placed in the remaining annulus. Wells located within the clay capped area were completed with protective stick up casings. The protective casings were equipped with a secure lockable cap to prevent entry to the monitoring well. For additional protection, a cap was placed on the monitoring well and the protective casing was set in place with concrete. The concrete on the CSB pad was set in an 18-inch pad while those within the clay capped area were set in a four-foot square form at the thickness of at least four inches (4").

Efforts to minimize turbidity were also undertaken during monitoring well development. Well development was performed using the surge and evacuate method after a period of at least 24 hours following well construction. Well development was considered complete when there was no visible increase in the clarity of the evacuated water. All wells were developed to below 50 NTU turbidity.

2.8.3 Low-Flow Groundwater Sampling

The objective of the low-flow groundwater procedure is to collect samples from monitoring wells while exerting minimum stress on the water-bearing formation and minimizing the disturbance of sediment in the well. One round of groundwater sampling was conducted on the newly installed wells from September 10th through 12th, 2012.

The depth to groundwater (static water level) was measured to within the nearest 0.01 foot in each well (results are provided on Table 3-3). The low-flow purging and sampling was conducted in accordance with procedures and methods described in the RDWPA. The general approach was to minimize the drawdown in the well during purging, thereby reducing disturbance prior to and during sampling. With one exception, this was accomplished by limiting the flow rate during purging and sampling to rates in the 100 to 250 mL/min range. The flow rate during the purging/sampling at MW-ISS-10I was maintained at 400 mL/min due to field error; however, the turbidity at this well was unaffected and remained well below 50 NTUs for the majority of the purging and the final turbidity reading prior to sampling was recorded as 14.2 NTUs.

During purging of the monitoring wells, the following field indicator parameters were monitored: turbidity, temperature, specific conductance, pH, oxidation-reduction potential (ORP) and dissolved oxygen (DO). Purging was conducted at each well until the field parameters stabilized. In accordance with the RDWPA, a well was considered stabilized and ready for sample collection when three consecutive readings were within a range (from minimum to maximum measurements) as follows: ±0.1 for pH, 3% for specific conductance, ±10% for D.O., ±10 mV for ORP, and ±10% for turbidity. Measurement of the indicator parameters continued every three to five minutes until these measurements indicated stability in the water quality and the sample was collected. The field parameter measurements are provided on Field Data Sheets included as Appendix G. In accordance with the RDWPA, filtered and unfiltered samples were collected from all wells sampled to facilitate the evaluation of the effect of turbidity on mercury concentrations. Groundwater samples were transferred into appropriate laboratory supplied containers (preserved with nitric acid). Samples were packed on ice in coolers and hand delivered to the Test America shipping center located within one mile of the Site. Samples were analyzed for total mercury by USEPA Method 7470A.

2.9 Field Quality Assurance/Quality Control

Field Blanks

Field blanks consisting of analyte free water poured over representative pre-cleaned sampling equipment were utilized, where applicable. Field blanks were analyzed for mercury only and were collected at a rate of one per 20 samples.

Field Duplicate Samples

Field duplicate samples were collected as a measure of sampling and analytical repeatability. The duplicate samples were collected at a rate of one sample per 20 samples for mercury. Field duplicate samples were collected in addition to MS/MSD and laboratory QA/QC samples.

EPA Split Samples

EPA, through its oversight contractor CDM Smith, collected splits of the filtered groundwater samples from monitoring wells MW-ISS-10S, MW-ISS-11S and MW-ISS-12S. The split samples were submitted for mercury analysis to A4 Scientific, Inc., 1544 Sawdust Road, The Woodlands, Texas 77380. The complete data package for the split analyses is provided in Appendix J.

2.10 Data Management and Validation

2.10.1 Data Management

The data collected as part of the SRDI were added to the existing relational database previously described in detail in the RDIR. The database was utilized in conjunction with GIS to aid in the interpretation of the Site information because of its ability to organize and display spatial data with efficiency and accuracy.

2.10.2 Data Validation

A comprehensive, qualitative data validation was performed on each of the laboratory data packages to verify that information generated relative to a given sample was complete and accurate. The data validation was consistent with the information outlined in Worksheet Nos. 34, 35, and 36 in Attachment A of the QAPP. Data validation was streamlined by using the data results from the laboratory QC summaries and project data quality requirements, including measurement performance criteria for the data quality indicators, as specified in QAPP Worksheet Nos. 11, 12, 19, and 28. The criteria (limits) used for data verification were consistent with those listed on Worksheet No. 12 in Attachment A.

A complete list of all qualified results (including field QA/QC samples) and the reasons for the qualifications are provided in table format as Attachments A and B to the Data Usability Summary Reports contained in Appendix C. Quality Assurance Objectives are the broad goals for data collection and review. The following quality assurance objectives are described below: precision, accuracy, representativeness, completeness and comparability (PARCC).

- **Precision (P)** - Precision is defined as the degree of reproducibility of the measurements under a given set of conditions. Precision is documented on the basis of replicate/duplicate analyses: usually laboratory duplicate, laboratory control sample duplicates, or matrix spike duplicates.
- **Accuracy (A)** - Accuracy is defined as the bias in a measurement system. Accuracy is documented on the basis of recovery of surrogates, laboratory control samples, and matrix spikes.

- **Representativeness (R)** - Representativeness is defined as the degree to which data represent a characteristic of a set of samples. The representativeness of the analytical data is a function of the procedures and carefulness used in procuring and processing the samples. The representativeness can be documented by the relative percent difference between separately procured, but otherwise identical sample aliquots.
- **Completeness (C)** - The completeness objective for an analysis is to provide sufficient data of the acceptable quality such that the goals of the analytical project can be achieved. The overall project completeness is expressed as the percentage of planned data that is usable for its intended purpose.
- **Comparability (C)** - The comparability objective is to provide analytical data for which the accuracy, precision, representativeness, completeness and detection limit are similar to these quality indicators for data generated by other laboratories for similar samples. The comparability objective is documented by inter-laboratory studies carried out by regulator agencies or carried out for specific projects or contracts; and by comparison of periodically generated statements of accuracy, precision and detection limits with those of other laboratories.

The PARCC data quality objectives were evaluated during the data review process for the SRDI. The process of data review also included a completeness check to ensure that all data was properly loaded into the database used for report generation. Data that failed to meet the data quality assurance objectives for the RDI were qualified as to usability and potential low or high bias. Data was reviewed in accordance with the QAPP and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, October 1999 and Inorganic Data Review, October 2004. Where specific guidance was not available, the data were evaluated in a conservative manner consistent with industry standards using professional experience.

Laboratory results that met all the DQOs have been accepted without qualification. Results associated with QC parameters that did not meet objectives have been qualified as estimated (J flagged) or rejected as unusable for any purpose (R flagged). Data qualified as estimated should be evaluated by the data user as to whether it is acceptable for its intended purpose.

During the evaluation of the data, qualifiers were assigned, if necessary. The valid data qualifiers that were added to the data when necessary are defined as follows:

- U -Analyte not detected at the detection limit concentration.
- J -Reported value is an estimated concentration.
- UJ - Analyte not detected at an estimated detection limit concentration.
- R - This data was rejected and was not used for any purposes.

Data Quality Summary and Analytical Completeness

Overall, the SRDI data are acceptable for the intended purposes. All results are considered usable for the stated purpose and analytical completeness is 100 percent for all methods. Minor data quality issues with respect to field duplicate imprecision, and spike recoveries were identified; only some required qualification of the data.

Section 3

Supplemental RDI Findings

3.1 ISS Investigation

Full Laboratory Data Deliverable Packages (CD-ROM) are provided in Appendix H.

3.1.1 Pre-Screening Results

Soil and groundwater results from the pre-screening (direct-push) phase of the investigation are summarized in Tables 3-1 and 3-2, and are displayed on crossections of the ISS area (Figures 3-1 and 3-2). Total mercury concentrations in soil ranged from below detection limits (0.022U to 0.027U mg/kg) to 134 mg/kg at ISS-12, in the sample immediately beneath the concrete pad at a depth of 2 to 2.5 ft bgs. Total mercury concentrations in concrete collected from three locations within the concrete pad ranged from 0.16 mg/kg to 5.3 mg/kg.

Both filtered and non-filtered groundwater samples were collected from each direct-push sample interval. Dissolved (filtered) mercury concentrations in groundwater are depicted on Figures 3-1 and 3-2 and ranged from below detection limits (0.2U ug/L) to 3.3 µg/L at ISS-11. The analytical results for several filtered groundwater samples collected at the following locations/intervals were above the ISS action level of 0.7 ug/L:

- 1SS-10 from 12 to 16 ft bgs
- 1SS-11 from 10 to 14 ft bgs and 60 to 64 ft bgs
- ISS-12 from 11 to 15 ft bgs
- 1SS-13 from 18 to 22 ft bgs
- ISS-14 from 18 to 22 ft bgs
- ISS-15 from 12 to 16 ft bgs

All remaining results for filtered samples were below detection limits (0.2U µg/L) or below the ISS action level of 0.7 µg/L. Numerous pre-screening samples required the use of two filters to collect sufficient volume for analysis. Despite filtering, turbidity readings ranged from 99.4 NTU to 528 NTU, with at least one reading beyond the upper limit of the instrument (800 NTU). The elevated turbidity of the filtered samples indicates the results of the direct-push sampling should be used only for the intended purpose of identifying zones with relatively elevated mercury concentrations, and not for measuring actual dissolved mercury concentrations.

Mercury concentrations in unfiltered groundwater samples ranged from below detection limits (0.2U ug/L) to a maximum of 993µg/L at ISS-11. The maximum result was atypical and obtained from a sample collected at a depth interval of 10 to 14 ft bgs. That interval consisted primarily of silt and yielded minimal water for sampling.

3.1.2 Monitoring Well Results

Mercury concentrations in groundwater obtained from the newly-installed monitoring wells are provided on Table 3-4.The analytical results have been compared to the action level for implementation of ISS (0.7 µg/L dissolved mercury), which is also the New York State Class GA Groundwater Standard for mercury (6NYCRR Part 703). For discussion purposes, “total mercury” refers to a result from an unfiltered groundwater sample and “dissolved mercury” refers to a result from a field-filtered sample.

Total mercury concentrations ranged from below detection limits (0.2U ug/L) to 1.9 µg/L at MW-ISS-10D. Dissolved mercury concentrations from both the primary samples and the three EPA split samples are depicted on Figure 3-6. The dissolved mercury results ranged from below detection limits (0.2U ug/L) to 0.77 µg/L (split result) at MW-ISS-10D.

The following table compares EPA's three dissolved mercury results with the results of the primary samples.

Well Number	Concentration (ug/L)			
	Primary		EPA Split	
MW-ISS-10S	0.2	U	0.2	U
MW-ISS-11S	0.51		0.77	
MW-ISS-12S	0.2	U	0.3	

There were slight (sub-ppb) differences between the primary and split results obtained for two wells, MW-ISS-11S and MW-ISS-12S. While the QAPP does not provide criteria for comparison of split samples, the MW-ISS-11S results are similar and potentially reflect not only the variables introduced during the collection of the duplicate field samples, but also a number of potential, post-collection variables related to sample preservation, shipping conditions, and processing and analysis by a different laboratory. It should also be noted that the two results for MW-ISS-11S are extremely low (less than three tenths of a ppb difference) and close to the detection limit.

Figure 3-6 depicts dissolved mercury iso-concentrations lines based on the greatest dissolved mercury concentration obtained at each monitoring well cluster, regardless of sample date or depth. This simplified analysis provides a conservative (worst case) assessment of the extent of dissolved mercury concentrations over time, and readily identifies the area subject to ISS assuming it will extend to the deepest interval (~ 65 ft bgs) at all locations. The isoconcentration lines indicate that the dissolved mercury plume extends in a downgradient direction under the CSB pad, with concentrations falling below the 0.7 ug/L action level a short distance upgradient (north) of monitoring well clusters on the CSB pad. Figure 3-6 also shows alternative iso-concentration lines based on the three EPA split results, without averaging them with the corresponding primary results. This alternate interpretation indicates dissolved concentrations could potentially be greater than the 0.7 ug/L action level a short distance down gradient from the MW-ISS-11 well cluster, but not beyond the CSB pad. If split results were averaged with the primary analytical results, the average result would indicate the concentrations fall below 0.7 ug/L upgradient (north) of the MW-ISS-11 well cluster. As discussed in Section 4, analytical modeling based on conservative assumptions indicates the 0.7 ug/L contour could be no more than two feet south of the MW-ISS-11 well cluster.

3.2 Groundwater Contours

Groundwater levels for all onsite monitoring wells were measured after the groundwater sampling, after the wells had recovered to the pre-sampling water elevations (Table 3-3). Groundwater levels could not be measured at the MW-ISS-6 or MW-ISS-9 clusters due to recent paving activities on the adjacent Allied Property that partially or fully covered the wells. Contoured water table elevations obtained from the shallow monitoring wells are shown in Figure 3-3.The potentiometric surface in the intermediate portion of the aquifer is shown in Figure 3-4. The potentiometric surface in the deep portion of the aquifer is shown in Figure 3-5.The contoured values indicate that groundwater in the shallow, intermediate and deep portions of the aquifer flows in a south-southwest direction, towards the unnamed tributary. This is consistent with the groundwater flow directions identified in the Remedial Investigation and closely resembles conditions previously identified in the initial RDI.

3.3 TCLP Results

A total of seven soil samples and three concrete chip samples from the ISS direct-push investigations were analyzed for TCLP mercury and total mercury. Total and TCLP mercury results are provided on Table 3-1. All TCLP mercury concentrations were below 0.2 mg/L, the level at which waste materials are classified as Characteristic Hazardous Waste (code D009) for mercury toxicity. TCLP mercury concentrations ranged from below detection limits (0.002U mg/L) to 0.03 mg/L.

Section 4

Proposed Extent of ISS

A total of 34 monitoring wells in twelve well clusters have been installed over the course of the Remedial Design Investigation, including the supplemental RDI reported herein. The purpose of the wells is to delineate in three dimensions the zone to be treated with ISS. The monitoring wells are located and screened in intervals where initial sampling of soil and groundwater by direct-push methods indicated mercury concentrations were highest. As shown in Figure 3-6, the results of multiple rounds of groundwater sampling indicate that dissolved mercury concentrations are above the 0.7 µg/L action level in an oblong, east-west area encompassing the former retort building pad and extending east to the MW-ISS-6 well cluster. Concentrations above the 0.7 µg/L action level also extend south (downgradient) from the area of highest concentrations (under the retort pad) to a point near well cluster MW-ISS-11.

The lateral and vertical extent of the dissolved mercury plume can be fully delineated by the RDI and SRDI data. On the Allied property to the east, dissolved mercury concentrations in MW-ISS-6I range from 0.76 to 1.2 µg/L. As reported in the 50% Remedial Design submittal, analytical transport modeling indicates that concentrations above the 0.7 ug/L action level do not extend more than about three feet beyond MW-ISS-6I.Similar analytical transport modeling was conducted in the area of MW-ISS-11S to estimate the maximum downgradient distance of the 0.7 ug/L action level (Appendix K). The modeling conservatively assumed a dissolved mercury concentration at MW-ISS-11S of 0.77ug/L, which is the greater of the primary and split sample results obtained for this location. The modeling indicates that concentrations above the 0.7 ug/L action level do not extend more than about two feet beyond MW-ISS-11S.

Based on the RDI and SRDI data, the lateral extent of ISS will cover the area shown in Figure 4-1. The remedial design will address the need to maintain a continuous cap from the limit of the existing clay cap (circa 1986) to the ISS area, recognizing that part of the continuous cap will likely be a portion of the existing concrete pad from the former CSB.

References

Brown and Caldwell Associates. June 2012. Remedial Design Work Plan Addendum, Mercury Refining Superfund Site, Colonie, New York. June 2012.

Brown and Caldwell Associates. May 2012. Environmental Assessment and Pre-Demolition Survey, Mercury Refining Superfund Site, Colonie, New York. May 23, 2012

Brown and Caldwell Associates. March 2012. Preliminary Remedial Design Report (50% Design Submittal), Mercury Refining Superfund Site, Colonie, New York. March 2012.

Brown and Caldwell Associates. December 2011. Remedial Design Investigation Report, Mercury Refining Superfund Site, Colonie, New York. December 2011.

Tables

TABLE 2-1
SOIL BORING AND MONITORING WELL BACKGROUND INFORMATION
SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

	Survey Coordinates NY State Plane - NAD 83		Ground Surface Elevation	Total Depth	Depth to Clay	Elevation Clay	Screened Interval		Screened Interval	
Location ID	Northing	Easting	(ft., NGVD)	(ft., BGS)	(ft., BGS)	(ft., NGVD)	Top (ft., BGS)	Bottom (ft., BGS)	Top (ft., NGVD)	Bottom (ft., NGVD)
ISS Direct Push Borings										
ISS10	1406144.068	676522.623	234.36	68	64	170.36	--	--	--	--
ISS11	1406151.777	676505.078	234.40	64	57	177.4	--	--	--	--
ISS12	1406159.524	676486.189	234.42	63	--	--	--	--	--	--
ISS13	1406126.676	676514.234	234.17	68	55.3	178.87	--	--	--	--
ISS14	1406134.239	676496.920	234.21	68	64	170.21	--	--	--	--
ISS15	1406140.944	676478.675	234.12	72	68	166.12	--	--	--	--
Monitoring Wells										
MW-ISS-10D	1406146.549	676476.137	234.28	65.0	68.0	166.3	55.0	65.0	179.28	169.28
MW-ISS-10I	1406147.557	676473.394	234.30	44.0	--	--	34.0	44.0	200.30	190.30
MW-ISS-10S	1406148.637	676470.047	234.31	24.0	--	--	14.0	24.0	220.31	210.31
MW-ISS-11D	1406129.472	676505.826	234.23	65.0	64.0	170.2	55.0	65.0	179.23	169.23
MW-ISS-11I	1406131.041	676502.296	234.24	44.0	--	--	34.0	44.0	200.24	190.24
MW-ISS-11S	1406132.575	676498.895	234.22	24.0	--	--	14.0	24.0	220.22	210.22
MW-ISS-12D	1406114.528	676477.134	231.03	68.0	64.0	167.0	53.0	63.0	178.03	168.03
MW-ISS-12I	1406113.602	676479.537	230.99	42.0	--	--	32.0	42.0	198.99	188.99
MW-ISS-12S	1406112.704	676481.943	230.96	22.0	--	--	12.0	22.0	218.96	208.96
MW-ISS-13D	1406104.972	676499.623	230.85	63.0	62.5	168.3	53.0	63.0	177.85	167.85
MW-ISS-13I	1406105.305	676497.786	230.85	42.0	--	--	32.0	42.0	198.85	188.85
MW-ISS-13S	1406103.257	676501.882	230.86	22.0	--	--	12.0	22.0	218.86	208.86

Notes:
-- Data not available or not applicable
NGVD - National Geodetic Vertical Datum
BGS - Below Ground Surface

TABLE 3-1
Soil Analytical Results
ISS Pre-screening
Supplemental Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

Location Name	Begin Depth	End Depth	Sample Date	Sample Type	Total Mercury (MG/KG)	TCLP Mercury (MG/L)
ISS-10	1.5	2	6/26/2012	N	2.2	0.0002 U
ISS-10	12	12.5	6/26/2012	N	0.57	NA
ISS-10	24	24.5	6/26/2012	N	0.043	NA
ISS-10	32	32.5	6/26/2012	N	0.023 U	NA
ISS-10	44	44.5	6/26/2012	N	0.026 U	NA
ISS-10	56	56.5	6/26/2012	N	0.024 U	NA
ISS-10	66	66.5	6/26/2012	N	0.026 U	NA
ISS-11 (Concrete)	0	0.5	6/27/2012	N	5.3	0.028
ISS-11	2	2.5	6/27/2012	N	2.5	0.0002
ISS-11	12	12.5	6/27/2012	N	3.4	NA
ISS-11	20	20.5	6/27/2012	N	0.21	NA
ISS-11	28	28.5	6/27/2012	N	0.08	NA
ISS-11	36	36.5	6/27/2012	N	0.38	NA
ISS-11	44	44.5	6/27/2012	N	0.05	NA
ISS-11	56	56.5	6/27/2012	N	0.023 U	NA
ISS-11	64	64.5	6/27/2012	N	0.027 U	NA
ISS-12	2	2.5	6/28/2012	N	*134	0.03
ISS-12	5	5.5	6/28/2012	N	0.092	0.0002 U
ISS-12	9	9.5	6/28/2012	N	3.3	NA
ISS-12	20	20.5	6/28/2012	FD	0.026 U	NA
ISS-12	20	20.5	6/28/2012	N	0.023 U	NA
ISS-12	32	32.5	6/28/2012	N	0.96 J	NA
ISS-12	44	44.5	6/28/2012	N	0.28	NA

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
NA – Not analyzed.
N – Original environmental sample.
FD – Field duplicate sample.
* (Red) concentrations are above New York State Soil Cleanup Objective for Industrial Use (6 NYCRR Part 375) for Total Mercury of 5.7 mg/kg or above the TCLP limit of 0.2 mg/L.

TABLE 3-1
Soil Analytical Results
ISS Pre-screening
Supplemental Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

Location Name	Begin Depth	End Depth	Sample Date	Sample Type	Total Mercury (MG/KG)	TCLP Mercury (MG/L)
ISS-12	52	52.5	6/28/2012	N	0.032	NA
ISS-12	62.5	63	6/28/2012	N	0.022 U	NA
ISS-13 (Concrete)	0	0.5	6/25/2012	N	0.33	0.00054
ISS-13	1.5	2	6/25/2012	N	3	0.0002 U
ISS-13	12	12.5	6/25/2012	N	0.82	NA
ISS-13	23.5	24	6/25/2012	N	0.027 U	NA
ISS-13	35.5	36	6/26/2012	N	0.024 U	NA
ISS-13	47	47.5	6/26/2012	N	0.023 U	NA
ISS-13	54.5	55	6/26/2012	FD	0.024 U	NA
ISS-13	54.5	55	6/26/2012	N	0.024 U	NA
ISS-13	64	64.5	6/26/2012	N	0.026 U	NA
ISS-14	1.5	2	6/27/2012	N	*8.1	NA
ISS-14	8	8.5	6/27/2012	N	0.15	0.0002 U
ISS-14	16	16.5	6/27/2012	N	0.73	NA
ISS-14	24	24.5	6/27/2012	N	0.024 U	NA
ISS-14	32	32.5	6/27/2012	N	0.04	NA
ISS-14	40	40.5	6/27/2012	N	0.065	NA
ISS-14	48	48.5	6/27/2012	N	0.024 U	NA
ISS-14	56	56.5	6/27/2012	N	0.025 U	NA
ISS-14	64	64.5	6/27/2012	N	0.026 U	NA
ISS-15 (Concrete)	0	0.5	6/28/2012	N	0.16	0.00038
ISS-15	2	2.5	6/28/2012	N	3.2	NA
ISS-15	4.5	5	6/28/2012	N	1.2	0.0002 U

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
NA – Not analyzed.
N – Original environmental sample.
FD – Field duplicate sample.
* (Red) concentrations are above New York State Soil Cleanup Objective for Industrial Use (6 NYCRR Part 375) for Total Mercury of 5.7 mg/kg or above the TCLP limit of 0.2 mg/L.

TABLE 3-1
Soil Analytical Results
ISS Pre-screening
Supplemental Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

Location Name	Begin Depth	End Depth	Sample Date	Sample Type	Total Mercury (MG/KG)	TCLP Mercury (MG/L)
ISS-15	8.5	9	6/29/2012	N	0.024 U	NA
ISS-15	20	20.5	6/29/2012	N	1.8	NA
ISS-15	28	28.5	6/29/2012	N	0.024 U	NA
ISS-15	36	36.5	6/29/2012	FD	0.026 U	NA
ISS-15	36	36.5	6/29/2012	N	0.023 U	NA
ISS-15	44	44.5	6/29/2012	N	0.026 U	NA
ISS-15	60	60.5	6/29/2012	N	0.027 U	NA
ISS-15	71.5	72	6/29/2012	N	0.024 U	NA

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
NA – Not analyzed.
N – Original environmental sample.
FD – Field duplicate sample.
* (Red) concentrations are above New York State Soil Cleanup Objective for Industrial Use (6 NYCRR Part 375) for Total Mercury of 5.7 mg/kg or above the TCLP limit of 0.2 mg/L.

TABLE 3-2
Groundwater Analytical Results
ISS Pre-screening
Supplemental Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

Location Name	Begin Depth	End Depth	Sample Date	Sample Type	Total Mercury (UG/L)	Dissolved Mercury (UG/L)
ISS-10	12	16	7/10/2012	N	*4.6	*3
ISS-10	22	26	7/10/2012	N	*2.1	0.25
ISS-10	32	36	7/10/2012	N	0.63	0.2 U
ISS-10	42	46	7/10/2012	N	0.4	0.2 U
ISS-10	52	56	7/11/2012	N	0.2 U	0.2 U
ISS-10	62	66	7/11/2012	N	*16.1	0.46
ISS-11	10	14	7/11/2012	N	*993	*3.3
ISS-11	20	24	7/11/2012	N	*0.91	0.21
ISS-11	30	34	7/11/2012	N	0.2 U	0.2 U
ISS-11	40	44	7/11/2012	N	0.2 U	0.2 U
ISS-11	50	54	7/11/2012	N	0.2 U	0.2 U
ISS-11	60	64	7/12/2012	N	*10.1	*0.88
ISS-12	11	15	7/17/2012	N	*67.2	*1.6
ISS-12	21	25	7/17/2012	N	0.68	0.2 U
ISS-12	31	35	7/17/2012	N	0.2 U	0.2 U
ISS-12	41	45	7/17/2012	N	0.46	0.2 U
ISS-12	51	55	7/18/2012	N	0.2 U	0.2 U
ISS-13	18	22	7/9/2012	N	*5.2	*1.6
ISS-13	28	32	7/9/2012	N	0.2 U	0.2 U
ISS-13	38	42	7/10/2012	N	*1.9	0.2 U

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
UJ – The analyte was not detected above the reported method detection limit. However, based on data validation, the reported method detection limit is approximate and may or may not represent the actual limit of the detection necessary to accurately and precisely measure the analyte in the sample.
NA – Not analyzed.
N – Original environmental sample.
FD – Field duplicate sample.
* (Red) concentration is above New York State Class GA Groundwater Standard of 0.7 ug/L.

TABLE 3-2
Groundwater Analytical Results
ISS Pre-screening
Supplemental Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

Location Name	Begin Depth	End Depth	Sample Date	Sample Type	Total Mercury (UG/L)	Dissolved Mercury (UG/L)
ISS-13	48	52	7/10/2012	FD	0.2 U	0.2 U
ISS-13	48	52	7/10/2012	N	0.2 U	0.2 U
ISS-13	58	62	7/10/2012	N	0.2 U	0.2 U
ISS-14	18	22	7/12/2012	N	*142	*1.9
ISS-14	28	32	7/12/2012	FD	0.27 J	0.2 U
ISS-14	28	32	7/12/2012	N	0.2 UJ	0.2 U
ISS-14	38	42	7/12/2012	N	0.2 U	0.2 U
ISS-14	48	52	7/13/2012	N	*0.79	0.2 U
ISS-14	58	62	7/13/2012	N	*3	0.2 U
ISS-15	12	16	7/16/2012	N	*8.1	*1.7
ISS-15	22	26	7/16/2012	N	*1.1	0.2 U
ISS-15	32	36	7/16/2012	N	0.2 U	0.2 U
ISS-15	42	46	7/16/2012	N	0.2 U	0.2 U
ISS-15	52	56	7/17/2012	N	0.2 U	0.2 U
ISS-15	62	66	7/17/2012	N	*0.91	0.2 U

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
UJ – The analyte was not detected above the reported method detection limit. However, based on data validation, the reported method detection limit is approximate and may or may not represent the actual limit of the detection necessary to accurately and precisely measure the analyte in the sample.
NA – Not analyzed.
N – Original environmental sample.
FD – Field duplicate sample.
* (Red) concentration is above New York State Class GA Groundwater Standard of 0.7 ug/L.

TABLE 3-3
GROUNDWATER ELEVATION DATA
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

Location ID	Top of Casing Elevation (ft., NGVD)	Ground Elevation (ft., NGVD)	Screened Interval Top (ft., BGS)	Screened Interval Bottom (ft., BGS)	Screened Interval Top (ft., NGVD)	Screened Interval Bottom (ft., NGVD)	9/12/2012 Depth to Water (ft. BTOC)	9/12/2012 Water Elevation (ft. NGVD)
MW-ISS-1D	234.53	234.84	55.0	65.0	179.84	169.84	14.05	220.48
MW-ISS-1I	234.56	234.83	35.0	45.0	199.83	189.83	13.96	220.60
MW-ISS-1S	234.28	234.84	15.0	25.0	219.84	209.84	13.05	221.23
MW-ISS-2D	234.48	234.81	55.0	65.0	179.81	169.81	13.15	221.33
MW-ISS-2I	234.58	234.82	30.0	40.0	204.82	194.82	13.01	221.57
MW-ISS-3D	234.02	234.20	55.0	65.0	179.20	169.20	13.25	220.77
MW-ISS-3I	233.82	234.28	30.0	40.0	204.28	194.28	12.75	221.07
MW-ISS-5D	233.32	233.80	47.0	57.0	186.80	176.80	13.35	219.97
MW-ISS-5I	233.18	233.84	30.0	40.0	203.84	193.84	13.1	220.08
MW-ISS-5S	233.36	233.82	15.0	25.0	218.82	208.82	12.75	220.61
MW-ISS-6D	232.56	233.23	50.0	60.0	183.23	173.23	NM	NM
MW-ISS-6I	232.95	233.19	30.0	40.0	203.19	193.19	NM	NM
MW-ISS-6S	232.88	233.31	15.0	25.0	218.31	208.31	NM	NM
MW-ISS-7D	234.04	234.57	48.5	58.5	186.07	176.07	13.41	220.63
MW-ISS-7I	233.78	234.51	35.0	45.0	199.51	189.51	13.45	220.33
MW-ISS-7S	233.98	233.98	15.0	25.0	218.98	208.98	12.88	221.10
MW-ISS-8D	233.39	233.85	47.0	57.0	186.85	176.85	13.31	220.08
MW-ISS-8I	233.49	233.97	30.0	40.0	203.97	193.97	13.22	220.27
MW-ISS-8S	233.58	233.94	15.0	25.0	218.94	208.94	12.92	220.66
MW-ISS-9D	232.86	233.41	48.0	58.0	185.41	175.41	NM	NM
MW-ISS-9I	232.92	233.34	30.0	40.0	203.34	193.34	NM	NM
MW-ISS-9S	232.86	233.35	15.0	25.0	218.35	208.35	NM	NM
MW-ISS-10D	233.94	234.28	55.0	65.0	179.28	169.28	14.64	219.30
MW-ISS-10I	234.07	234.30	34.0	44.0	200.30	190.30	14.42	219.65
MW-ISS-10S	233.97	234.31	14.0	24.0	220.31	210.31	13.59	220.38
MW-ISS-11D	233.81	234.23	55.0	65.0	179.23	169.23	14.6	219.21
MW-ISS-11I	233.92	234.24	34.0	44.0	200.24	190.24	14.32	219.60
MW-ISS-11S	233.93	234.22	14.0	24.0	220.22	210.22	13.66	220.27
MW-ISS-12D	233.57	231.03	53.0	63.0	178.03	168.03	14.82	218.75
MW-ISS-12I	233.15	230.99	32.0	42.0	198.99	188.99	14	219.15
MW-ISS-12S	233.28	230.96	12.0	22.0	218.96	208.96	13.98	219.30

TABLE 3-3
GROUNDWATER ELEVATION DATA
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

Location ID	Top of Casing Elevation (ft., NGVD)	Ground Elevation (ft., NGVD)	Screened Interval Top (ft., BGS)	Screened Interval Bottom (ft., BGS)	Screened Interval Top (ft., NGVD)	Screened Interval Bottom (ft., NGVD)	9/12/2012 Depth to Water (ft. BTOC)	9/12/2012 Water Elevation (ft. NGVD)
MW-ISS-13D	232.88	230.85	53.0	63.0	177.85	167.85	14.15	218.73
MW-ISS-13I	232.77	230.85	32.0	42.0	198.85	188.85	13.71	219.06
MW-ISS-13S	232.93	230.86	12.0	22.0	218.86	208.86	13.6	219.33

NGVD - National Geodetic Vertical Datum
BGS - Below Ground Surface
BTOC - Below Top of Casing
NI - Not Installed
NM- Not measured

TABLE 3-4
Groundwater Analytical Results - Monitoring Wells
Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

GW Quality

Analyte Group: Metals *Analyte Name*	Class GA Groundwater Criteria NYS Part 703(1) Standard	Federal MCL	*Units*	*Location:* / *SampleName:* / *SampleDate:*	*MW-ISS-10S* / *MW-ISS-10S-N* / *9/12/2012*	*MW-ISS-10I* / *MW-ISS-10I-N* / *9/11/2012*	*MW-ISS-10D* / *MW-ISS-10D-N* / *9/12/2012*	*MW-ISS-11S* / *MW-ISS-11S-N* / *9/12/2012*	*MW-ISS-11I* / *MW-ISS-11I-N* / *9/11/2012*	*MW-ISS-11D* / *MW-ISS-11D-N* / *9/12/2012*
Mercury, Dissolved	0.7	2	UG/L		0.2 U	0.2 U	0.53	0.51	0.2 U	0.2 U
Mercury, Total	0.7	2	UG/L		0.2 U	0.2 U	*1.9	0.64	0.2 U	0.2 U

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
UJ – The analyte was not detected above the reported method detection limit. However, based on data validation, the reported method detection limit is approximate and may or may not represent the actual limit of the detection necessary to accurately and precisely measure the analyte in the sample.
NE – Standard and/or guidance value not established.
NA – Not analyzed.
ND – Not detected.
* (Red) concentration is above New York State Class GA Groundwater Standard of 0/7 ug/L.

TABLE 3-4
Groundwater Analytical Results - Monitoring Wells
Remedial Design Investigation
Mercury Refining Superfund Site
Colonie, New York

GW Quality

Analyte Group: Metals *Analyte Name*	Class GA Groundwater Criteria NYS Part 703(1) Standard	Federal MCL	*Units*	*Location:* / *SampleName:* / *SampleDate:*	*MW-ISS-12S* / *MW-ISS-12S-N* / *9/11/2012*	*MW-ISS-12I* / *MW-ISS-12I-N* / *9/10/2012*	*MW-ISS-12I* / *MW-ISS-12I-FD* / *9/10/2012*	*MW-ISS-12D* / *MW-ISS-12D-N* / *9/11/2012*	*MW-ISS-13S* / *MW-ISS-13S-N* / *9/11/2012*	*MW-ISS-13I* / *MW-ISS-13I-N* / *9/10/2012*	*MW-ISS-13D* / *MW-ISS-13D-N* / *9/10/2012*
Mercury, Dissolved	0.7	2	UG/L		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Mercury, Total	0.7	2	UG/L		0.3	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.33

Notes:
U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.
J – Estimated concentration. The result is below the quantitation limit but above the method detection limit.
UJ – The analyte was not detected above the reported method detection limit. However, based on data validation, the reported method detection limit is approximate and may or may not represent the actual limit of the detection necessary to accurately and precisely measure the analyte in the sample.
NE – Standard and/or guidance value not established.
NA – Not analyzed.
ND – Not detected.
* (Red) concentration is above New York State Class GA Groundwater Standard of ug/L.

Figures

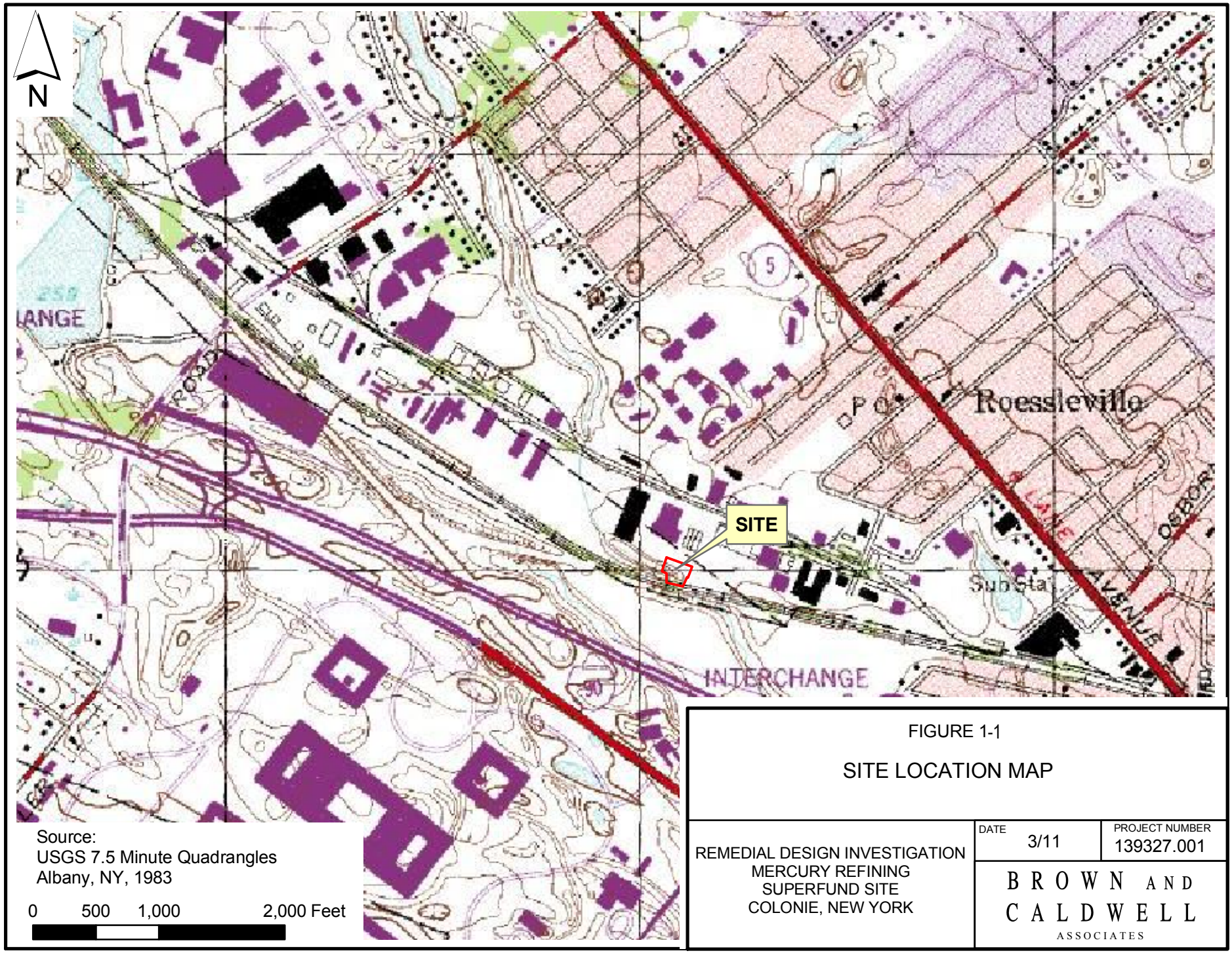

FIGURE 1-1

SITE LOCATION MAP

REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING
SUPERFUND SITE
COLONIE, NEW YORK

DATE	PROJECT NUMBER
3/11	139327.001

BROWN AND CALDWELL
ASSOCIATES

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N

Legend

- Property Boundary
- Fence
- Site Feature (As Labelled)
- 233 — Ground Surface Elevation (FT., NGVD)
- Stream Edge
- Approximate Former Retort Pad
- Alignment of Current Storm Sewer (Dashed Where Inferred, CRA 1986)
- Approximate Alignment of Original Storm Sewer (CRA 1986)
- Approximate Extent of Clay Capped Area (CRA 1986)
- Approximate Extent of Asphalt/Concrete Capped Area (CRA 1986)
- ROD-Defined Investigation Area (ROD Figure 2 September 2008)
- Current Storm Sewer Feature (Catch Basin/Manhole)
- CDM Well
- RDI ISS Boring Location
- ISS Monitoring Well Location

DIAMOND W. PROPERTY

MERECO PROPERTY

ALLIED BUILDING PRODUCTS PROPERTY

MERECO PROPERTY

AREA A

AREA B

AREA C

AREA D

AREA E

EXISTING PHASE 1 & 1A BUILDING

FORMER CONTAINER STORAGE BUILDING

STORAGE SHED

ASPHALT

VEGETATION

APPROXIMATE STORM SEWER OUTFALL

STORM SEWER OUTFALL

RAILROAD CULVERT

CB-3 CB-4 CB-5 CB-6 CB-7

OW-1 MW-1D OW-2 MW-2D OW-3 OW-4

MW-ISS-2I MW-ISS-2D ISS-2 ISS-3 MW-ISS-3D MW-ISS-3I MW-ISS-7D MW-ISS-7I MW-ISS-7S MW-ISS-1D MW-ISS-1I MW-ISS-1S ISS-1 ISS4 MW-5D MW-ISS-8S MW-ISS-8I MW-ISS-8D ISS6 MW-ISS-9D MW-ISS-9I MW-ISS-9S MW-ISS-10S MW-ISS-10I MW-ISS-10D MW-ISS-11S MW-ISS-11I MW-ISS-11D MW-ISS-5S MW-ISS-5I MW-ISS-5D ISS5 MW-ISS-6D MW-ISS-6I MW-ISS-6S MW-ISS-12I MW-ISS-12D MW-ISS-12S MW-ISS-13I MW-ISS-13D MW-ISS-13S

0 20 40 Feet

Note:
(1) Basemap provided by MJ Engineering and Land Surveying, P.C. updated September 2012.

Reference:
Conestoga-Rovers & Associates. Final Report, Remedial Program,Albany Plant Site; March 7, 1986. (CRA 1986)

FIGURE 1-2

SITE PLAN

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION MERCURY REFINING SUPERFUND SITE COLONIE, NEW YORK

DATE 09/28/2012

PROJECT NUMBER 142324

BROWN AND CALDWELL ASSOCIATES

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N

EXISTING PHASE 1 & 1A BUILDING

FORMER CONTAINER STORAGE BUILDING

AREA B

AREA E

MH-1

CB-5

CB-6

CB-7

OW-4

OW-1

MW-1D

OW-2

MW-2D

OW-3

MW-ISS-2I
MW-ISS-2D
ISS-2

MW-ISS-7D
MW-ISS-7I
MW-ISS-7S

ISS-3
MW-ISS-3D
MW-ISS-3I

MW-ISS-1D
MW-ISS-1I
MW-ISS-1S
ISS-1

MW-ISS-9D
MW-ISS-9I
MW-ISS-9S

ISS-DP-12
MW-5D
ISS4

MW-ISS-10S
MW-ISS-10I
MW-ISS-10D
ISS-DP-15

ISS-DP-11
MW-ISS-8S
MW-ISS-8I
ISS-DP-10
MW-ISS-8D
ISS6

ISS-DP-14
MW-ISS-11S
MW-ISS-11I
MW-ISS-11D

MW-ISS-5S
MW-ISS-5I
MW-ISS-5D
ISS-DP-13
ISS5

MW-ISS-6D
MW-ISS-6I
MW-ISS-6S

MW-ISS-12I
MW-ISS-12D
MW-ISS-12S

MW-ISS-13I
MW-ISS-13D
MW-ISS-13S

APPROXIMATE STORM SEWER OUTFALL

STORM SEWER OUTFALL

RAILROAD CULVERT

216 222 228 234 230 232 234

Legend

- Property Boundary
- Fence
- Site Feature (As Labelled)
- 233 — Ground Surface Elevation (FT., NGVD)
- Stream Edge
- Approximate Former Retort Pad
- Alignment of Current Storm Sewer (Dashed Where Inferred, CRA 1986)
- Approximate Alignment of Original Storm Sewer (CRA 1986)
- Approximate Extent of Clay Capped Area (CRA 1986)
- Approximate Extent of Asphalt/Concrete Capped Area (CRA 1986)
- ROD-Defined Investigation Area (ROD Figure 2 September 2008)
- Current Storm Sewer Feature (Catch Basin/Manhole)
- CDM Well
- RDI ISS Direct Push Investigation Location
- SRDI ISS Direct Push Investigation Location
- RDI ISS Monitoring Well Location
- SRDI ISS Monitoring Well Location

0 10 20
Feet

Note:
(1) Basemap provided by MJ Engineering and Land Surveying, P.C. updated September 2012.

Reference:
Conestoga-Rovers & Associates. Final Report, Remedial Program,Albany Plant Site; March 7, 1986. (CRA 1986)

P:\GIS\Mercury_Refining_Superfund\SRDI_Figure_SRDI_Loc.mxd

FIGURE 2-1
SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION LOCATIONS

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING
SUPERFUND SITE
COLONIE, NEW YORK

DATE 09/28/2012

PROJECT NUMBER 142324

BROWN AND CALDWELL
ASSOCIATES

0 10 20

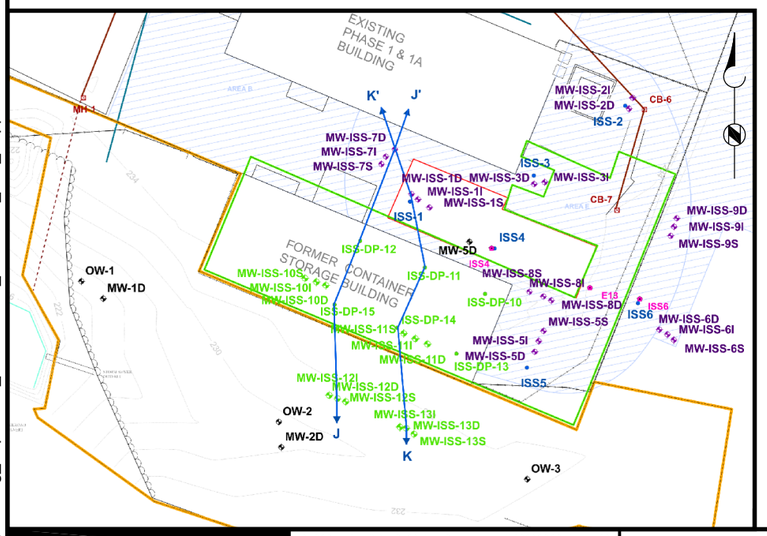
SCALE IN FEET

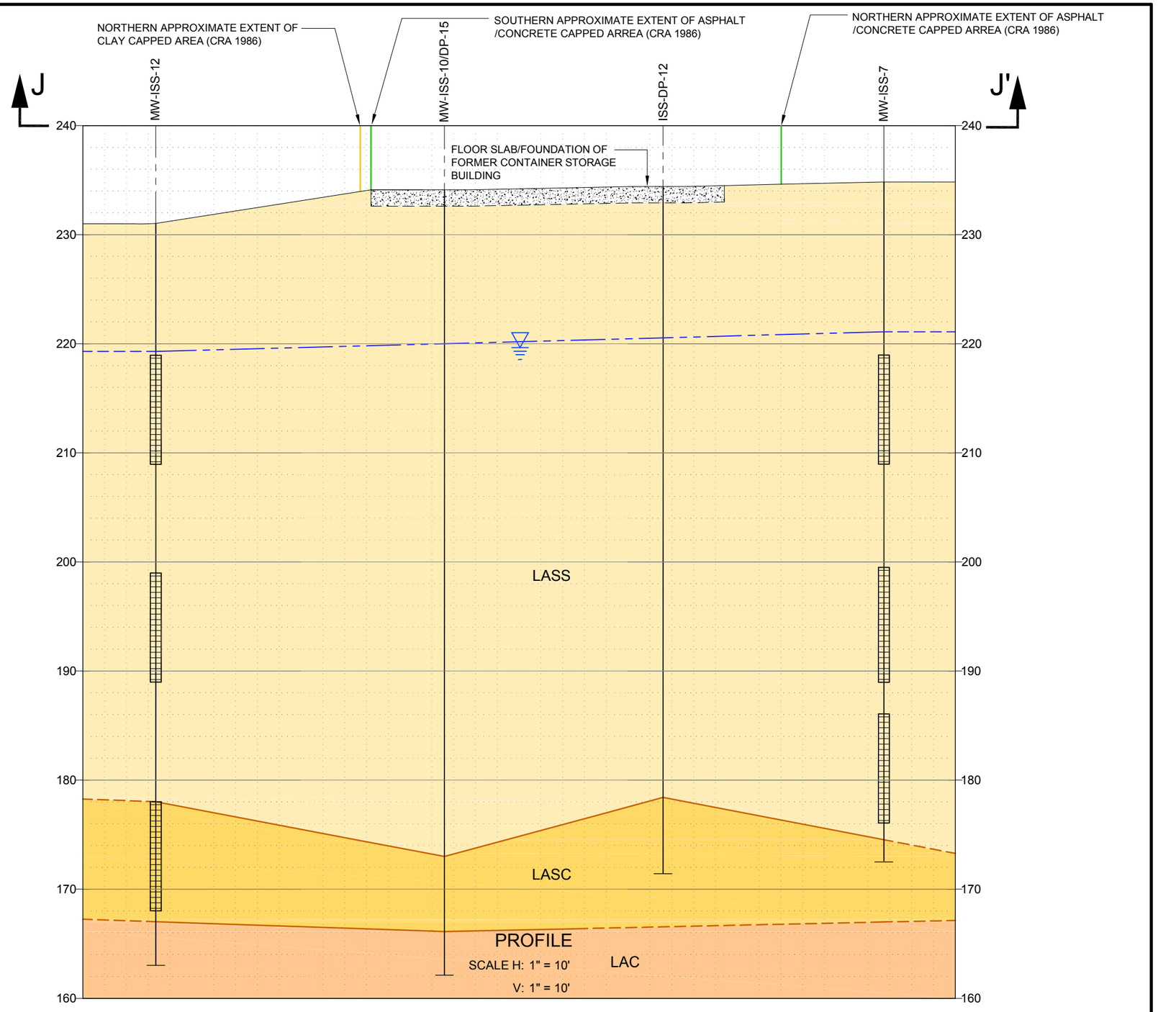
LEGEND:

- APPROXIMATE FORMER RETORT PAD
- APPROXIMATE EXTENT OF CLAY CAPPED AREA (CRA 1986)
- APPROXIMATE EXTENT OF ASPHALT/ CONCRETE CAPPED AREA (CRA 1986)

LEGEND:

- MW-ISS-3I — MONITORING WELL IDENTIFICATION AND LOCATION
- GENERALIZED GROUND SURFACE
- WELL SCREEN INTERVAL
- TOTAL DEPTH OF BOREHOLE
- GENERALIZED SILT AND CLAY SURFACE BASED ON BORING (DASHED WHERE INFERRED OR DIFFERENT DRILLING METHOD USED)
- WATER TABLE (SEPTEMBER 9, 2012)
- CONCRETE BUILDING PAD
- LASS — LAKE ALBANY SILTY SAND UNIT
- LASC — LAKE ALBANY SILT AND CLAY UNIT
- LAC — LAKE ALBANY CLAY UNIT





BROWN AND CALDWELL ASSOCIATES

DATE: December 5, 2012

MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

CROSS SECTION J-J'
SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION

FIGURE
2-2

0 10 20

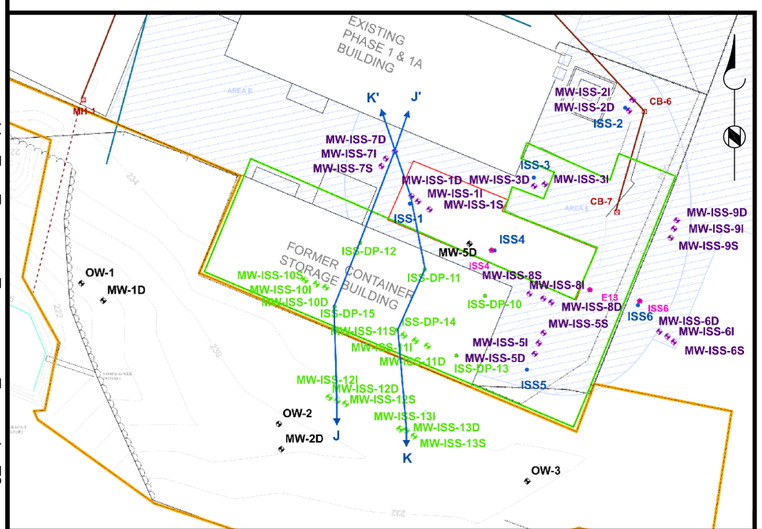
SCALE IN FEET

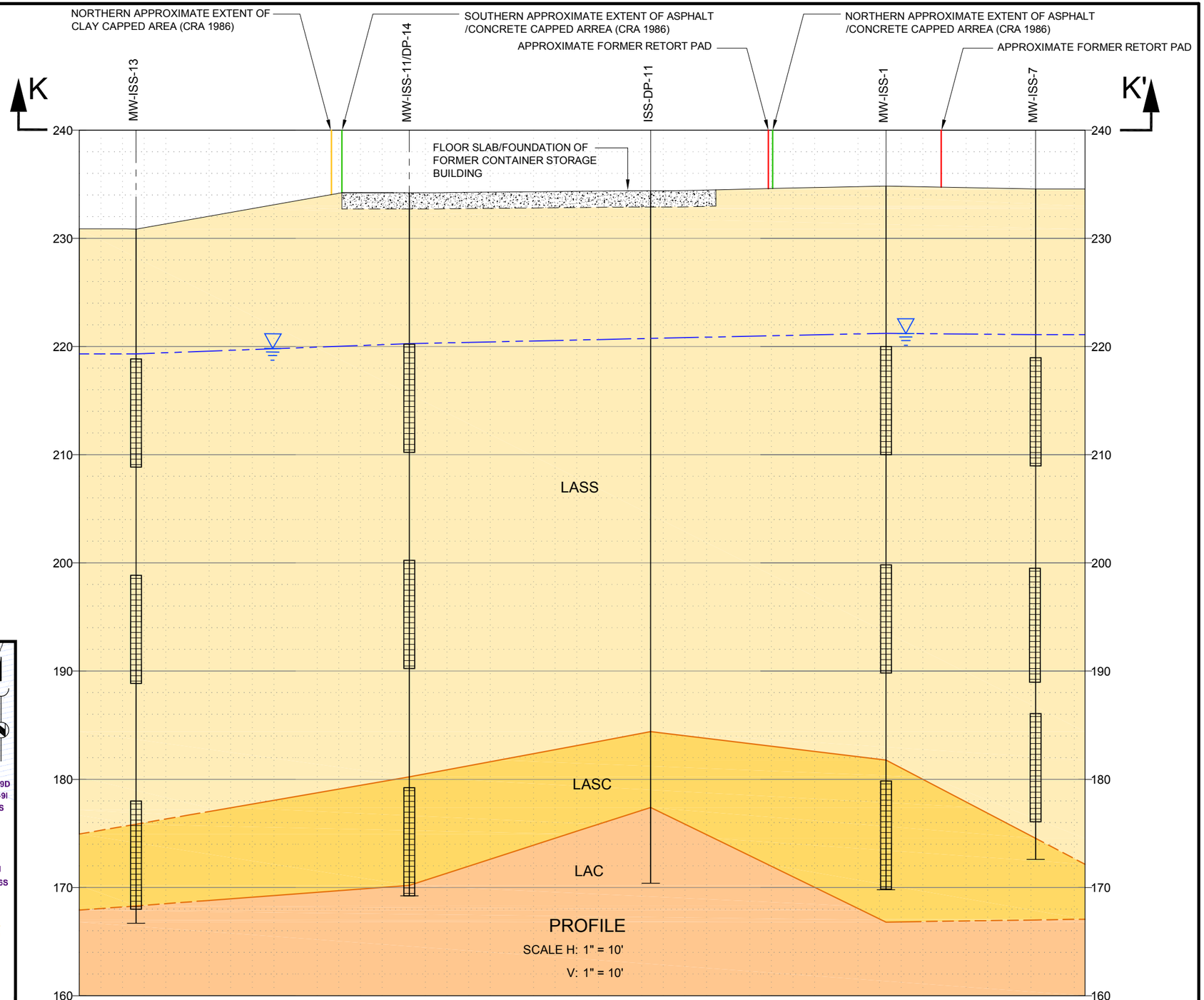
LEGEND:

- APPROXIMATE FORMER RETORT PAD
- APPROXIMATE EXTENT OF CLAY CAPPED AREA (CRA 1986)
- APPROXIMATE EXTENT OF ASPHALT/ CONCRETE CAPPED AREA (CRA 1986)

LEGEND:

- MW-ISS-3I — MONITORING WELL /BORING IDENTIFICATION AND LOCATION
- GENERALIZED GROUND SURFACE
- WELL SCREEN INTERVAL
- TOTAL DEPTH OF BOREHOLE
- GENERALIZED SILT AND CLAY SURFACE BASED ON BORING (DASHED WHERE INFERRED OR DIFFERENT DRILLING METHOD USED)
- WATER TABLE (SEPTEMBER 9, 2012)
- CONCRETE BUILDING PAD
- LASS — LAKE ALBANY SILTY SAND UNIT
- LASC — LAKE ALBANY SILT AND CLAY UNIT
- LAC — LAKE ALBANY CLAY UNIT





Brown AND Caldwell

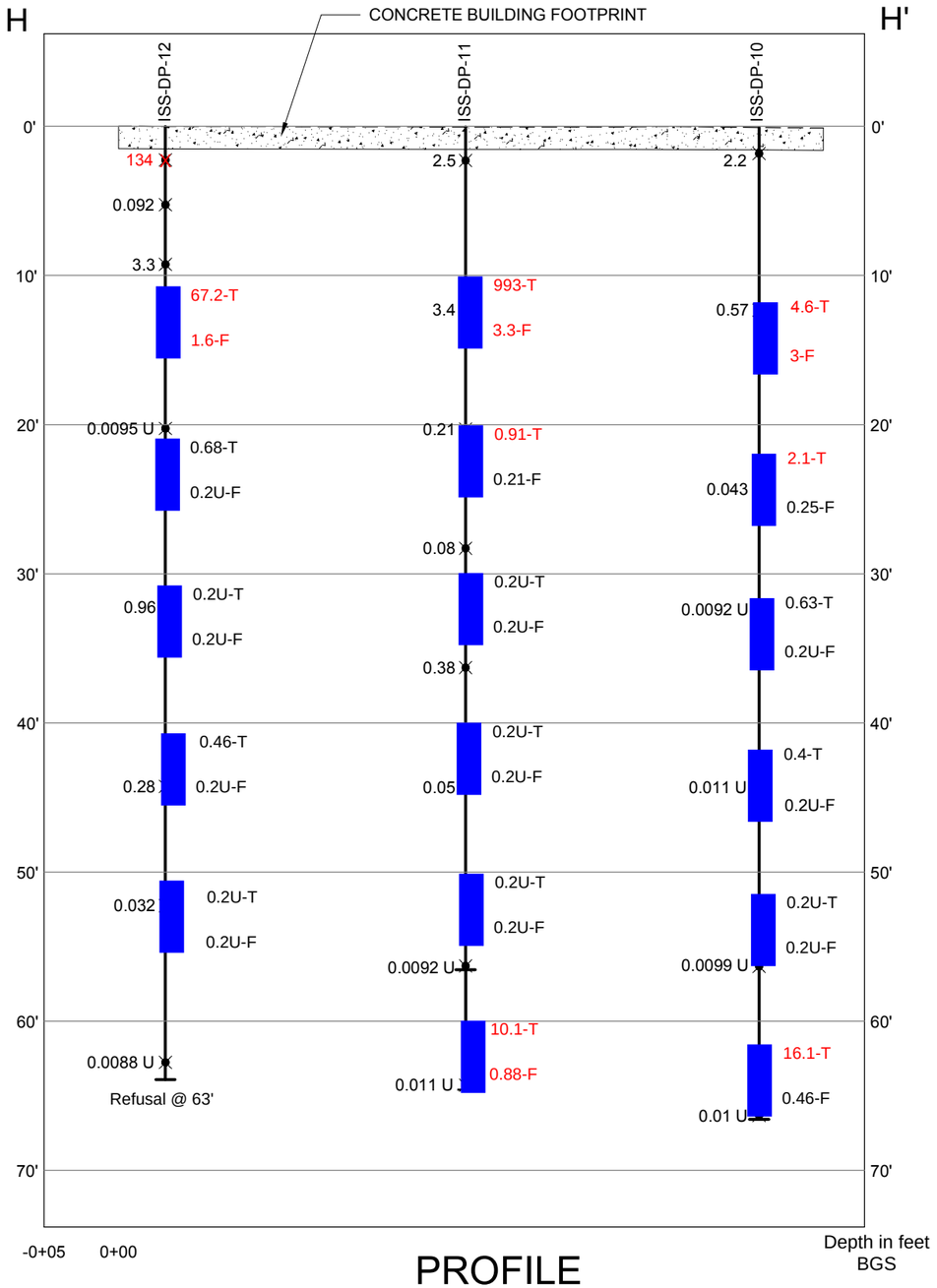
BROWN AND CALDWELL ASSOCIATES

DATE: December 5, 2012

MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

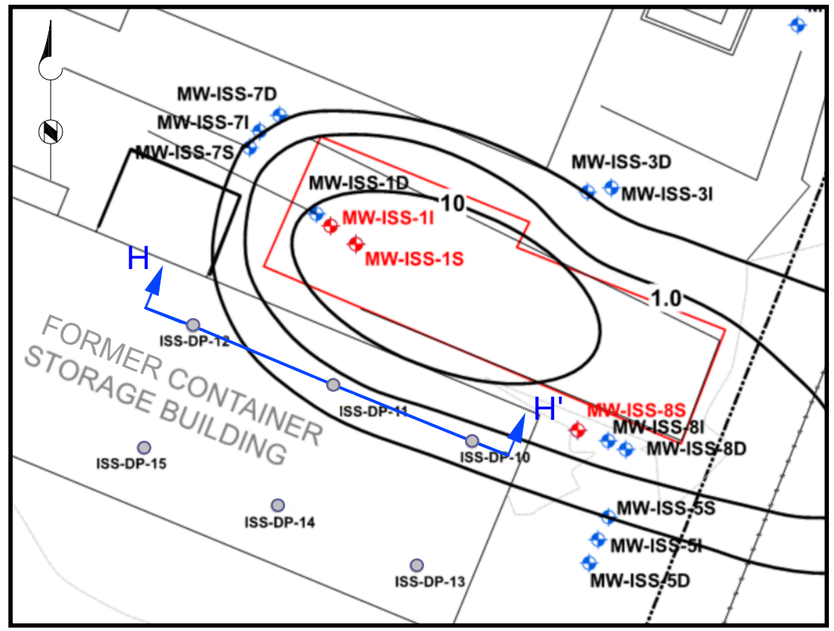
CROSS SECTION K-K'
SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION

FIGURE
2-3



PROFILE

SCALE H: 1" = 10'
V: 1" = 10'

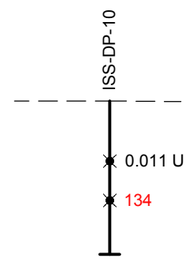


ALIGNMENT VIEW

PLAN

SCALE: 1" = 20'

LEGEND:



LOCATION ID

APPROXIMATE SURFACE

SOIL SAMPLE RESULTS IN mg/kg

SOIL SAMPLE RESULTS > 5.7mg/kg

BORING DEPTH

GW SAMPLE

GW SAMPLE EXCEEDS 0.7 UG/L

F - FILTERED GW SAMPLE

T - TOTAL / UN - FILTERED GW SAMPLE

PROPOSED WELL SCREEN DEPTHS

U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.

Brown AND Caldwell Associates

SCALE: 1" = 10'

142324

DATE: July 16, 2012

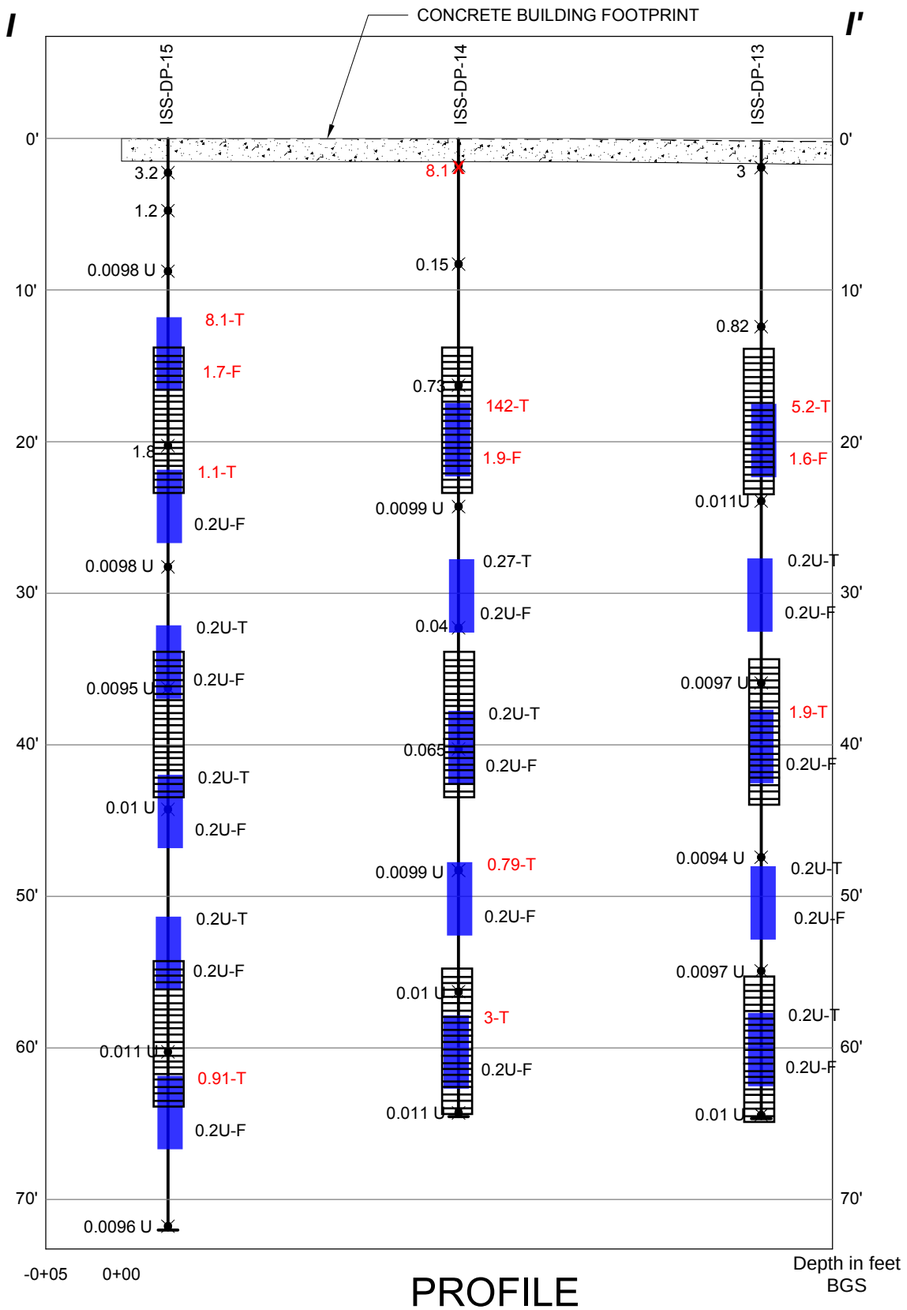
MERCURY REFINNING
SUPERFUND SITE
COLONIE, NEW YORK

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION

POTENTIAL ISS AREA PRE-SCREENING ANALYTICAL RESULTS SOIL AND GROUNDWATER, CROSS SECTION H-H'

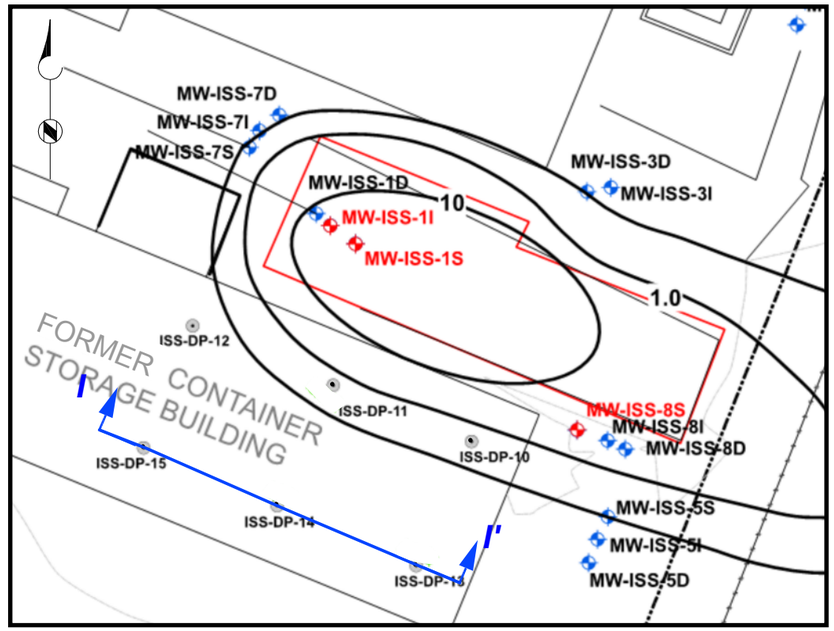
FIGURE 3-1

Path: P:\DRAFTING\Mercury_Refining_Superfund\142324-Geological_Cross_Sections\CADD\2-SHEETS\B-GEOTECHNICAL DEPTH (FEET) File Name: 142324-Cross-Section-H-H Plot Date: July 16, 2012 1:50 PM Cadd



PROFILE

SCALE H: 1" = 10'
V: 1" = 10'

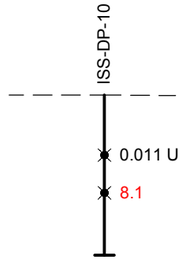


ALIGNMENT VIEW

PLAN

SCALE: 1" = 20'

LEGEND:



LOCATION ID

APPROXIMATE SURFACE

SOIL SAMPLE RESULTS IN mg/kg

SOIL SAMPLE RESULTS > 5.7 mg/kg

BORING DEPTH

GW SAMPLE

GW SAMPLE EXCEEDS 0.7 UG/L

F - FILTERED GW SAMPLE

T - TOTAL / UN - FILTERED GW SAMPLE

PROPOSED WELL SCREEN DEPTHS

U – The analyte was analyzed for, but was not detected. Value shown is the method detection limit (MDL) for the analyzed constituent.

Brown AND Caldwell Associates

SCALE: 1" = 10'

142324

DATE: July 16, 2012

MERCURY REFINNING
SUPERFUND SITE
COLONIE, NEW YORK

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION

POTENTIAL ISS AREA PRE-SCREENING ANALYTICAL RESULTS SOIL AND GROUNDWATER, CROSS SECTION I-I'

FIGURE 3-2

Path: P:\DRAFTING\Mercury_Refining_Superfund\142324-Geological_Cross_Sections\CADD\2-SHEETS\B-GEOTECHNICAL File Name: 142324-Cross-Section-I-I Plot Date: July 16, 2012 1:53 PM Cadd U

N

MW-ISS-2I

MW-ISS-2D

MW-ISS-7D

MW-ISS-7S
(221.1)

MW-ISS-7I

MW-ISS-3D

MW-ISS-3I

MW-ISS-1D

MW-ISS-1I

MW-ISS-1S
(221.23)

MW-ISS-9D

MW-ISS-9I

MW-ISS-9S
(NM)

MW-ISS-10S
(220.379)

MW-ISS-10I

MW-ISS-10D

MW-ISS-8S
(220.66)

MW-ISS-8I

MW-ISS-8D

MW-ISS-11S
(220.27)

MW-ISS-11I

MW-ISS-11D

MW-ISS-5S
(220.61)

MW-ISS-5I

MW-ISS-5D

MW-ISS-6D

MW-ISS-6I

MW-ISS-6S
(NM)

MW-ISS-12I

MW-ISS-12D

MW-ISS-12S
(219.3)

MW-ISS-13I

MW-ISS-13D

MW-ISS-13S
(219.33)

221.50

221.00

220.50

219.50

219.0

234

232

230

FORMER CONTAINER STORAGE BUILDING

0 8 16 Feet

Legend

- Property Boundary
- Fence
- Site Feature (As Labelled)
- 233 Ground Surface Elevation (FT., NGVD)
- ISS Monitoring Well Location
- Water Table Elevation Contour (FT., NGVD) Dashed Where Inferred
- 223 Water Table Elevation (FT., NGVD)
- Localized Direction Of Groundwater Flow

Note:
NM - Indicates "Not Measured" (due to well obstructed by recent paving)

FIGURE 3-3

Water Table Contours
Shallow Overburden Aquifer
September 9, 2012

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

DATE 10/12/2012

PROJECT NUMBER 142324

BROWN AND CALDWELL
ASSOCIATES

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N

EXISTING PHASE 1 & 1A BUILDING

FORMER CONTAINER STORAGE BUILDING

220.50

220.00

219.50

219.00

221.0

221.5

234

232

230

MW-ISS-7I (220.33)
MW-ISS-7D
MW-ISS-7S

MW-ISS-1D
MW-ISS-1I (220.6)
MW-ISS-1S

MW-ISS-10S
MW-ISS-10I (219.6543)
MW-ISS-10D

MW-ISS-11S
MW-ISS-11I (219.6)
MW-ISS-11D

MW-ISS-12I (219.15)
MW-ISS-12D
MW-ISS-12S

MW-ISS-13I (219.06)
MW-ISS-13D
MW-ISS-13S

MW-ISS-3D
MW-ISS-3I (221.07)

MW-ISS-2I (221.57)
MW-ISS-2D

MW-ISS-9D
MW-ISS-9I (NM)
MW-ISS-9S

MW-ISS-8S
MW-ISS-8I (220.27)
MW-ISS-8D

MW-ISS-5S
MW-ISS-5I (220.08)
MW-ISS-5D

MW-ISS-6D
MW-ISS-6I (NM)
MW-ISS-6S

0 8 16 Feet

Legend

- Property Boundary
- Fence
- Site Feature (As Labelled)
- 233 Ground Surface Elevation (FT., NGVD)
- ISS Monitoring Well Location
- Potentiometric Surface Contour (FT., NGVD) Dashed Where Inferred
- 223 Groundwater Elevation (FT., NGVD)
- Localized Direction Of Groundwater Flow

Note:
NM - Indicates "Not Measured" (due to well obstructed by recent paving)

FIGURE 3-4

Potentiometric Surface
Intermediate Overburden Aquifer
September 9, 2012

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

DATE 10/12/2012

PROJECT NUMBER 142324

BROWN AND CALDWELL
ASSOCIATES

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N

221.0

220.5

222.0

219.50

219.00

218.50

MW-ISS-2I

MW-ISS-2D
(221.33)

MW-ISS-7D
(220.63)

MW-ISS-7I

MW-ISS-7S

MW-ISS-3D
(220.77)

MW-ISS-3I

MW-ISS-1D
(220.48)

MW-ISS-1I

MW-ISS-1S

MW-ISS-9D
(NM)

MW-ISS-9I

MW-ISS-9S

FORMER CONTAINER STORAGE BUILDING

MW-ISS-10S

MW-ISS-10I

MW-ISS-10D
(219.2971)

MW-ISS-8S

MW-ISS-8I

MW-ISS-8D
(220.08)

MW-ISS-6D
(NM)

MW-ISS-6I

MW-ISS-6S

MW-ISS-11S

MW-ISS-11D
(219.21)

MW-ISS-11I

MW-ISS-5S

MW-ISS-5I

MW-ISS-5D
(219.97)

MW-ISS-12I

MW-ISS-12D
(218.75)

MW-ISS-12S

MW-ISS-13I

MW-ISS-13D
(218.73)

MW-ISS-13S

0 8 16 Feet

Note:
NM - Indicates "Not Measured" (due to well obstructed by recent paving)

Legend

- Property Boundary
- Fence
- Site Feature (As Labelled)
- 233 — Ground Surface Elevation (FT., NGVD)
- ISS Monitoring Well Location
- Potentiometric Surface Contour (FT., NGVD) Dashed Where Inferred
- 222 Groundwater Elevation (FT., NGVD)
- Localized Direction Of Groundwater Flow

FIGURE 3-5

Potentiometric Surface
Deep Overburden Aquifer
September 9, 2012

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

DATE 10/12/2012

PROJECT NUMBER 143247

BROWN AND CALDWELL
ASSOCIATES

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N

MW-ISS-2I	8/31/2010	11/17/2010	1/25/2011
Dissolved Hg	--	--	0.12 U

MW-ISS-2D	8/31/2010	11/17/2010	1/25/2011
Dissolved Hg	--	0.1 U	0.12 U

MW-ISS-7I	11/18/2010	1/27/2011
Dissolved Hg	--	0.12 U

MW-ISS-7D	11/18/2010	1/26/2011
Dissolved Hg	--	0.12 U

MW-ISS-7S	11/18/2010	1/28/2011
Dissolved Hg	--	0.12 U

MW-ISS-3I	8/31/2010	11/16/2010	1/25/2011
Dissolved Hg	--	--	0.12 U

MW-ISS-1D	9/1/2010	11/15/2010	1/26/2011
Dissolved Hg	--	0.1 U	0.12 U

MW-ISS-3D	9/1/2010	11/16/2010	1/25/2011
Dissolved Hg	0.2	0.1 U	0.12 U

MW-ISS-1I	8/31/2010	11/15/2010	1/26/2011
Dissolved Hg	--	--	1.2

MW-ISS-9D	11/19/2010	1/25/2011
Dissolved Hg	--	0.12 U

MW-ISS-9I	11/19/2010	1/25/2011
Dissolved Hg	--	0.12 U

MW-ISS-1S	9/1/2010	11/15/2010	1/26/2011
Dissolved Hg	--	--	37.3

MW-ISS-9S	11/19/2010	1/25/2011
Dissolved Hg	--	0.12 U

MW-ISS-10S	9/12/2012
Dissolved Hg	0.2U/0.2U

MW-ISS-10I	9/11/2012
Dissolved Hg	0.2U

MW-ISS-10D	9/12/2012
Dissolved Hg	0.53

MW-ISS-8S	11/18/2010	1/27/2011
Dissolved Hg	--	3.5

MW-ISS-8I	11/18/2010	1/27/2011
Dissolved Hg	--	0.12 U

MW-ISS-6D	9/1/2010	11/16/2010	1/26/2011	6/27/2011
Dissolved Hg	--	--	0.12U	0.12U

MW-ISS-6I	8/31/2010	11/16/2010	1/26/2011	6/27/2011
Dissolved Hg	--	--	0.76	1.2

MW-ISS-11S	9/12/2012
Dissolved Hg	0.51/0.77

MW-ISS-11I	9/11/2012
Dissolved Hg	0.2U

MW-ISS-11D	9/12/2012
Dissolved Hg	0.2U

MW-ISS-8D	11/18/2010	1/27/2011
Dissolved Hg	--	0.12 U

MW-ISS-5S	8/30/2010	11/17/2010	1/27/2011
Dissolved Hg	--	--	0.12 U

MW-ISS-6S	9/1/2010	11/17/2010	1/26/2011	6/27/2011
Dissolved Hg	--	--	0.12 U	0.12 U

MW-ISS-5I	8/30/2010	11/17/2010	1/27/2011
Dissolved Hg	--	--	0.12 U

MW-ISS-12I	9/10/2012
Dissolved Hg	0.2U

MW-ISS-12D	9/11/2012
Dissolved Hg	0.2U

MW-ISS-5D	8/30/2010	11/16/2010	11/27/2011
Dissolved Hg	--	--	0.12 U

MW-ISS-12S	9/11/2012
Dissolved Hg	0.2U/0.3

MW-ISS-13I	9/10/2012
Dissolved Hg	0.2U

MW-ISS-13D	9/10/2012
Dissolved Hg	0.2U

MW-ISS-13S	9/11/2012
Dissolved Hg	0.2U

10

0.7

ND

0.7

ND

STORAGE BUILDING

222 234 216 232 234

Legend

- Property Boundary
- Fence
- 0.2U/0.2U — Analytical Result/EPA Split Result (if collected)
- Dissolved Hg Isoconcentration Contour (ug/L)
- Contour Based on EPA Split Results (without averaging)
- 233 — Ground Surface Elevation (FT., NGVD)
- Former Retort Pad (Approximate)
- Monitoring Well
- Monitoring Well Exhibiting Exceedence of Cleanup Level

Notes:
1) All results in ug/L.
2) Red Highlight Indicates an Exceedence of theCleanup Level of 0.7 ug/L.
3) "U" Indicates Not Detected
4) Basemap provided by MJ Engineering and Land Surveying, P.C.updated September 2012.

0 10 20 Feet

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FIGURE 3-6

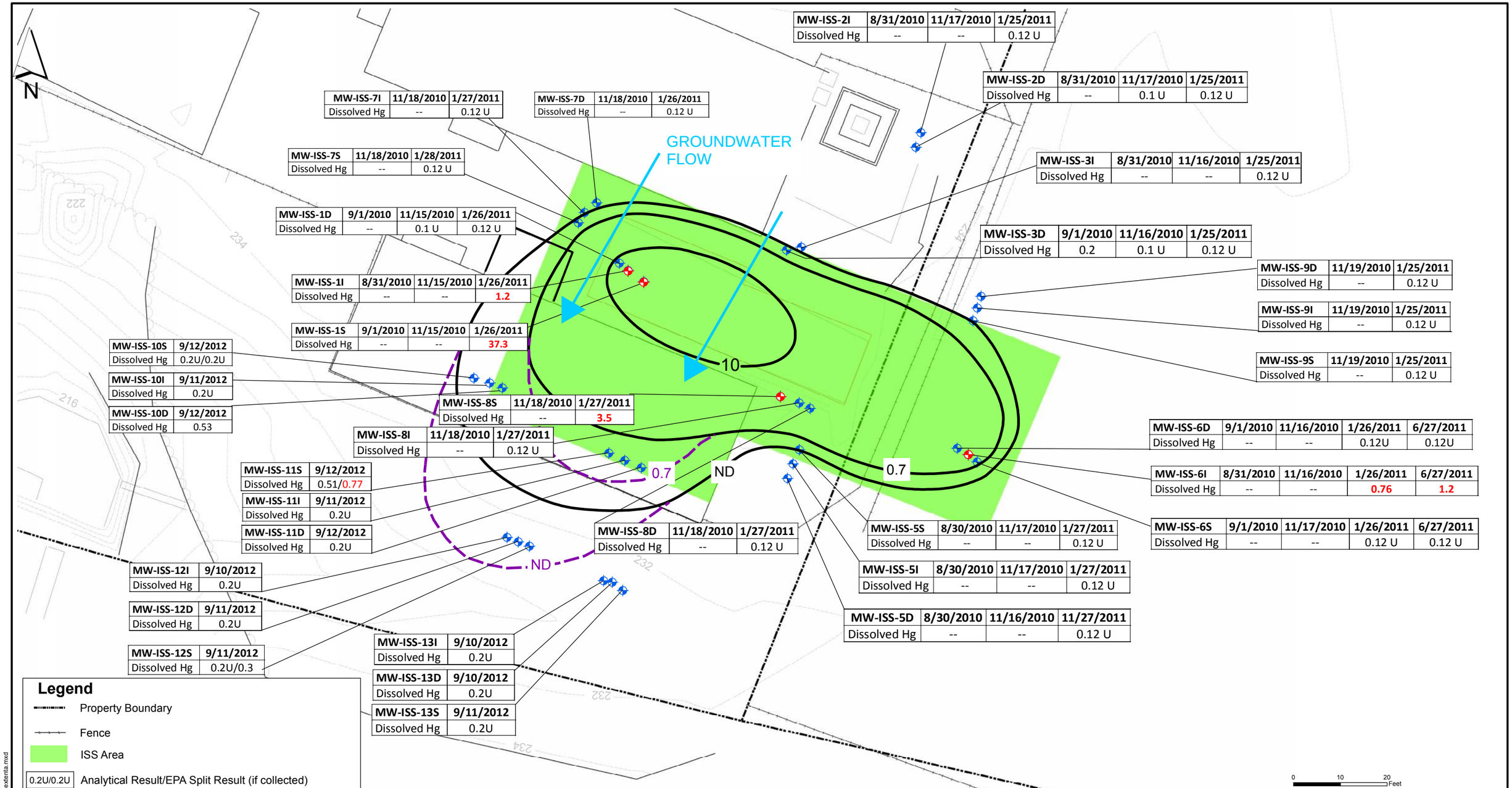
GROUNDWATER SAMPLING DISSOLVED MERCURY ANALYTICAL RESULTS IN ISS MONITORING WELLS

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

DATE 10/18/2012

PROJECT NUMBER 142324

BROWN AND CALDWELL
ASSOCIATES



Legend

- Property Boundary
- Fence
- ISS Area
- 0.2U/0.2U — Analytical Result/EPA Split Result (if collected)
- Dissolved Hg Isoconcentration Contour (ug/L)
- Contour Based on EPA Split Results (without averaging)
- 233 — Ground Surface Elevation (FT., NGVD)
- Former Retort Pad (Approximate)
- Monitoring Well
- Monitoring Well Exhibiting Exceedence of Cleanup Level

Notes:
1) All results in ug/L.
2) Red Highlight Indicates an Exceedence of theCleanup Level of 0.7 ug/L.
3) "U" Indicates Not Detected
4) Basemap provided by MJ Engineering and Land Surveying, P.C.updated September 2012.

Note: Final extent of ISS downgradient from MW-ISS-11 will be based on analytical modeling.

FIGURE 4-1
PROPOSED EXTENT OF IN-SITU SOLIDIFICATION / STABILIZATION

SUPPLEMENTAL REMEDIAL DESIGN INVESTIGATION
MERCURY REFINING SUPERFUND SITE
COLONIE, NEW YORK

DATE: 10/18/2012
PROJECT NUMBER: 142324

BROWN AND CALDWELL
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